JOSH GREEN, M.D.
GOVERNOR | KE KIAʻĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIAʻĀINA

STATE OF HAWAIʻI | KA MOKUʻĀINA ʻO HAWAIʻI
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA ʻOIHANA KUMUWAIWAI ʻĀINA

P.O. BOX 621
HONOLULU, HAWAII 96809

DAWN N.S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RYAN K.P. KANAKAʻOLE
FIRST DEPUTY

CIARA W.K. KAHAHANE
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
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CONSERVATION AND COASTAL LANDS
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ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

September 22, 2025

**TO:** Mary Alice Evans, Director
Office of Planning and Sustainable Development

**THROUGH:** Dawn N.S. Chang, Chairperson
Department of Land and Natural Resources

**FROM:** David G. Smith, Administrator
Division of Forestry and Wildlife

**SUBJECT:** Publication of a Draft Environmental Assessment and Anticipated Finding of No Significant Impact (DEA-AFONSI) Honu'apo Estuary Wetland Restoration Project, Kaʻū District, Hawaiʻi Island, Portion of TMK: (3) 9-5-014:007

**APPLICANT:** State of Hawai'i Department of Land and Natural Resources (DLNR)

With this letter, the State of Hawai'i Department of Land and Natural Resources (DLNR) hereby transmits the Draft Environmental Assessment and Anticipated Finding of No Significant Impact (DEA-AFONSI) for the Honu'apo Estuary Wetland Restoration Project located in the Kaʻū District on Hawaiʻi Island The DEA has been prepared pursuant to Chapter 343, Hawai'i Revised Statutes, and Chapter 11-200.1, Hawai'i Administrative Rules.

We respectfully request that the DEA be published in the next available issue of *The Environmental Notice* for a 30-day public comment period. Materials required for the publication are being provided via the Environmental Review Program's online form.

If there are any questions regarding this letter, please contact Afsheen Siddiqi via email at afsheen.a.siddiqi@hawaii.gov.

Attachment 1: Draft Environmental Assessment Honuʻapo Estuary Wetland Restoration Project, Kaʻū District, Hawaiʻi Island

**From:** dbedt.opsd.erp@hawaii.gov
**To:** DBEDT OPSD Environmental Review Program
**Subject:** New online submission for The Environmental Notice
**Date:** Wednesday, October 1, 2025 2:17:38 PM

---

**Action Name**

Honuʻapo Estuary Wetland Restoration Project

**Type of Document/Determination**

Draft environmental assessment and anticipated finding of no significant impact (DEA-AFNSI)

**HRS §343-5(a) Trigger(s)**

- (1) Propose the use of state or county lands or the use of state or county funds
- (2) Propose any use within any land classified as a conservation district
- (3) Propose any use within a shoreline area

**Judicial district**

Kaʻū, Hawaiʻi

**Tax Map Key(s) (TMK(s))**

(3) 9-5-014:007

**Action type**

Agency

**Other required permits and approvals**

National Environmental Policy Act (Categorical Exclusion), Section 7, Section 106, Department of the Army, Hoʻāla Loko Iʻa Program, National Pollutant Discharge Elimination System, Special Management Area, Shoreline Setback Variance, Grading/Grubbing/Stockpiling Permit

**Proposing/determining agency**

Department of Land and Natural Resources, Division of Forestry and Wildlife

**Agency jurisdiction**

State of Hawaiʻi

**Agency contact name**

Afsheen Siddiqi

**Agency contact email (for info about the action)**

afsheen.a.siddiqi@hawaii.gov

**Email address for receiving comments**

wbow@kahewai.com

**Agency contact phone**

(808) 587-3250

**Agency address**

1151 Punchbowl Street

Room 325
Honolulu, Hawaii 96813
United States
Map It

**Is there a consultant for this action?**

Yes

**Consultant**

Kahewai Environmental LLC

**Consultant contact name**

William Bow

**Consultant contact email**

wbow@kahewai.com

**Consultant contact phone**

(808) 371-0676

**Consultant address**

2855 E MANOA RD
Suite 105, Box No. 316
Honolulu, HI 96822
United States
Map It

**Action summary**

The proposed project includes the restoration of approximately 8 acres of estuary and wetland habitat at the Honu'apo Estuary Wetland. Improvements to be implemented under the plan include: (1) removal of invasive vegetation to improve water quality and
quantity as well as habitat function; (2) creation of deepened water areas for improved habitat productivity and diversity; (3) revegetation with native plant species to provide natural site conditions for native endemic species; (4) installation of a predator proof fence; (5) pedestrian gate and walkway with viewing platforms.

**Reasons supporting determination**

See Section 5: Findings and Determination

**Attached documents (signed agency letter & EA/EIS)**

- Honuapo-DEA-publication-memo-signed1.pdf
- Honuapo-Estuary-Wetland-Restoration_Draft-EA2.pdf

**ADA Compliance certification (HRS §368-1.5):**

The authorized individual listed below acknowledges that they retain the responsibility for ADA compliance and are knowingly submitting documents that are unlocked, searchable, and may not be in an ADA compliant format for publication. Audio files do not include transcripts, captions, or alternative descriptions. The project files will be published without further ADA compliance changes from ERP, with the following statement included below the project summary in The Environmental Notice: "If you are experiencing any ADA compliance issues with the above project, please contact (authorized individual submitting the project at email)."

**Action location map**

- Honuapo-Estuary-Wetland-Restoration2.zip

**Authorized individual**

William F. Bow

**Authorized individual email**

wbow@kahewai.com

**Authorized individual phone**

(808) 371-0676

**Authorization**

- The above named authorized individual hereby certifies that he/she has the authority to make this submission.

**DRAFT**
**ENVIRONMENTAL ASSESSMENT**

# HONU‘APO ESTUARY WETLAND RESTORATION PROJECT

**Ka‘ū District, Hawai‘i Island**

**State of Hawai‘i**
**Department Land and Natural Resources**
**Division of Forestry and Wildlife**

**September 2025**

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# Honu‘apo Estuary Wetland Restoration Project

Ka‘ū District, Hawai‘i Island

## Draft Environmental Assessment

This environmental document has been prepared pursuant to
Hawai‘i Revised Statutes, Chapter 343
and Hawai‘i Administrative Rules, Title 11, Chapter 200.1

Prepared for:

State of Hawai‘i
Department of Land and Natural Resources
Division of Forestry and Wildlife
1151 Punchbowl St., Room 325
Honolulu, Hawai‘i 96813

Prepared by:

**Bow Engineering & Development, Inc.**

*Civil Engineering* *Planning*

1953 South Beretania Street, PH-A
Honolulu, Hawai‘i 96826
Telephone: (808) 941-8853
Fax: (808) 945-9299
www.bowengineering.com

and

Kahewai Environmental LLC
RJ Environmental Planning

September 2025

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# PROJECT SUMMARY

| | |
|---|---|
| **Project Name:** | Honuʻapo Estuary Wetland Restoration Project |
| **Location:** | Whittington Beach Park, Honuʻapo<br>Honuʻapo ahupuaʻa, Kaʻūˉ District, southern Hawaiʻi Island<br>Portion of TMK: (3) 9-5-014:007 |
| **Proposing/Approving Agency:** | State of Hawaiʻi, Department of Land and Natural Resources<br>Division of Forestry and Wildlife<br>1151 Punchbowl St., Room 325<br>Honolulu, Hawaiʻi 96813<br>Contact: David Smith<br>(808) 587-4181 |
| **Federal Funding Agency:** | U.S. Fish and Wildlife Service |
| **Proposed Project:** | The proposed project includes the restoration of approximately 8 acres of estuary and wetland habitat at the Honuʻapo Estuary Wetland. Improvements to be implemented under the plan include: (1) removal of invasive vegetation to improve water quality and quantity as well as habitat function; (2) creation of deepened water areas for improved habitat productivity and diversity; (3) revegetation with native plant species to provide natural site conditions for native endemic species; (4) installation of a predator proof fence; (5) pedestrian gate and walkway with viewing platforms |
| **State Land Use Designation:** | Conservation District and Agriculture District |
| **Existing Zoning:** | A-20a, Agricultural District (minimum building site of 20 acres) |
| **Special Management Area:** | Within County of Hawaiʻi SMA |
| **Anticipated Determination:** | Finding of No Significant Impact (FONSI) |
| **Anticipated NEPA Determination:** | Categorical Exclusion |

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## FREQUENTLY USED ACRONYMS AND ABBREVIATIONS

| Acronym/Abbreviation | Definition |
|---|---|
| Acre | 43,560 square feet |
| BMP | Best Management Practices |
| CFR | Code of Federal Regulations |
| Corps | United States Army Corps of Engineers |
| CWA | Clean Water Act |
| CZMA | Coastal Zone Management Act |
| DLNR | Department of Land and Natural Resources |
| DOFAW | Division of Forestry and Wildlife |
| DPR | Department of Parks and Recreation |
| EA | Environmental Assessment |
| ERP | Environmental Review Program |
| EPA | US Environmental Protection Agency |
| FEMA | Federal Emergency Management Agency |
| FESA | Federal Endangered Species Act |
| FIRM | Flood Insurance Rate Maps |
| FONSI | Finding of No Significant Impact |
| GHG | Greenhouse Gas |
| HAR | Hawai‘i Administrative Rules |
| HEPA | Hawai‘i Environmental Policy Act |
| HRS | Hawai‘i Revised Statutes |
| KOOH | Ka ‘Ohana O Honu‘apo |
| MBTA | Migratory Bird Treaty Act |
| MSL | Mean Sea Level |
| NAAQS | National Ambient Air Quality Standards |
| NEPA | National Environmental Policy Act |
| NFIP | National Flood Insurance Program |
| NHPA | National Historic Preservation Act |
| NMFS | National Marine Fisheries Service |
| NOAA | National Oceanographic and Atmospheric Administration |
| NPDES | National Pollutant Discharge Elimination System |
| NRCS | National Resource Conservation Service (formerly, Soil Conservation Service, USDA) |
| NWI | USFWS National Wetland Inventory |
| $PM_{10}$ | Suspended Particulate Matter; Ten micron Particulates |
| $PM_{2.5}$ | Fine Particulate Matter |
| SMA | Shoreline Management Area |
| SR | State Route |
| TMDL | Total Maximum Daily Load |
| TMK | Tax Map Key |
| USACE | United States Army Corps of Engineers |
| USFWS | United States Fish and Wildlife Service |
| USGS | United States Geological Survey |

# 1 INTRODUCTION

## 1.1 PROJECT INTRODUCTION AND PURPOSE AND NEED

The State of Hawai‘i, Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW) is proposing to restore ±8-acres of the Honu‘apo Estuary, located in the Honu‘apo ahupua‘a, Ka‘ū District, on the Island of Hawai‘i. The Honu‘apo property was purchased by the State of Hawai‘i in 2005 after the community group, Ka ‘Ohana O Honu‘apo (KOOH), came together with Trust for Public Lands to secure funding to acquire the property and preserve undeveloped open space along the coastline. The County of Hawai‘i, Department of Parks and Recreation (DPR) provides management over use of Honu‘apo lands, along with KOOH. Based on the detailed *Wetlands Habitat Restoration Plan for Honu‘apo Estuary* (Restoration Plan) prepared in 2011, an updated restoration plan has been developed for the project. Funding for the proposed wetland restoration project will be provided by the U.S. Fish and Wildlife Service (USFWS) and the State of Hawai‘i, in addition to other community partners, grants, and private donations.

The Honu‘apo estuary is part of a unique coastal ecosystem of semi-sheltered near-shore pools, brackish ponds, and open ocean environments. Estuarine wetlands are relatively rare on Hawai‘i Island, and the location of this system makes it of high value to both native and migratory birds using the southern portion of the island.

The primary objective of the project is the restoration and enhancement of the estuary to restore and enhance habitat form and function for the benefit of native plants and animals, with an emphasis on resident and migratory bird species. Secondary objectives include accommodating estimated sea level rise; improving aesthetics of the site; allowing for passive recreational and educational uses; and preserving cultural and historical values.

## 1.2 PURPOSE OF THE ENVIRONMENTAL ASSESSMENT

The evaluation of projects to determine their effects on the environment is required by the Hawai‘i Revised Statutes (HRS) Chapter 343. An Environmental Assessment (EA) is a “written evaluation to determine whether an action may have a significant effect” (HRS Section 343-2). The agency with primary responsibility over the project (the proposing agency) is required to prepare an EA and make a final environmental determination according to the presence of significant impacts or the lack thereof as set forth in the EA. As stated in HRS Section 343-1:

> An environmental review process will integrate the review of environmental concerns with existing planning processes of the state and counties, and alert decision makers to significant environmental effects which may result from the implementation of certain actions. …The process of reviewing environmental effects is desirable because environmental consciousness is enhanced, cooperation and coordination are encouraged, and public participation during the review process benefits all parties involved and society as a whole.

As described above, the basic purpose of an EA is to provide information to the public and decision makers on proposed actions. The EA must also disclose: potential significant adverse environmental impacts, the expected primary and secondary consequences, and the cumulative as well as the short- and long-term effects of the action.

## 1.3 FEDERAL AND STATE AUTHORITY

It is anticipated that funding for the restoration project will include both state and federal funding, making the project subject to environmental documentation requirements under both the Hawai'i Environmental Policy Act (HEPA) and the National Environmental Policy Act (NEPA).

### *State Regulatory Overview*

Environmental review procedures required by the State of Hawai'i include compliance with HRS Chapter 343 and Hawaii Administrative Rules (HAR) Title 11, Chapter 200.1, Department of Health, "Environmental Impact Statement Rules". The project site is located within the Hawai'i's land use district of "Conservation District," which is under the jurisdiction of the State Board of Land and Natural Resources (BLNR). Permitted uses are defined under HAR Title 13, Chapter 5. The project area is also located within the Hawai'i County's Special Management Area (SMA), as regulated under HRS Chapter 205A, Part II, and Hawai'i County Planning Commission Rules, Rule 9. In addition, the proposed action requires compliance with the Shoreline Setback Rules of the County of Hawai'i Planning Department (Planning Department Rule 11-5), and all work within the shoreline setback would need a variance. As a result, compliance with the State's environmental review process is required.

### *Federal Regulatory Overview*

The following is a summary of the federal laws and consultations that may be relevant to implementing the restoration project.

**National Environmental Policy Act**
The proposed action may be subject to compliance with the National Environmental Policy Act (NEPA) of 1969, 42 United States Code (USC) §4321, as implemented by the Council on Environmental Quality regulations, 40 Code of Federal Regulations (CFR) Parts 1500-1508 (40 CFR §1500 *et seq.*). Due to the limited nature of the proposed improvements, it is anticipated that a USFWS Categorical Exclusion would be appropriate for compliance with NEPA. A Categorical Exclusion means a category or kind of action that has no significant individual or cumulative effects on the quality of the human environment (40 CFR 1508.4).

**National Historic Preservation Act**
The National Historic Preservation Act (NHPA) of 1966, as amended (16 USC §470) recognizes the Nation's historic heritage and establishes a national policy for the preservation of historic properties as well as the National Register of Historic Places. Section 106 of the NHPA requires federal agencies to consider the effects of federal undertakings on historic properties. The Section 106 process, as defined in 36 CFR §800, provides for the identification and evaluation of historic properties, for determining the effects of undertakings on such properties, and for developing ways to resolve adverse effects through the process of consultation.

**Coastal Zone Management Act**
The purpose of the Coastal Zone Management Act (CZMA) of 1972, as amended (16 USC §1451 *et seq.*) is to encourage states to manage and conserve coastal areas as a unique, irreplaceable resource. Federal agency activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner that is consistent to the maximum extent practicable with the enforceable policies of approved state management programs.

HRS Chapter 205A implements this program for the State of Hawai'i, and Hawai'i County's Special Management Area (SMA) regulations under HRS Chapter 205A and Hawai'i County Planning Commission Rules, Rule 9 specifies the procedures for reviewing a project's consistency with coastal zone management objectives and policies.

**Endangered Species Act**
The Endangered Species Act (ESA) (16 USC §1531 *et seq*.) establishes a process for identifying and listing species. It requires all federal agencies to carry out programs for the conservation of federally listed endangered and threatened plants and animals, and prohibits actions by federal agencies that may adversely affect listed species or adversely modify designated critical habitat without formal consultation with the U.S. Fish and Wildlife Service or the National Oceanographic and Atmospheric Administration (NOAA). Section 7 of this Act specifies the consultation program conducted with these federal agencies.

**Clean Water Act**
The Clean Water Act (CWA) of 1972 is the primary federal law that protects the nation's waters, including lakes, rivers and coastal areas. The primary objective of the CWA is to restore and maintain the integrity of the nation's waters.

Section 401 of the CWA requires a Water Quality Certification (WQC) be obtained from the state (or territory) for actions that require a federal permit to conduct an activity, construction or operation that may result in a discharge into waters of the United States. The State of Hawai'i Department of Health, Clean Water Branch (DOH-CWB) implements this program issuing WQC permits for activities affecting jurisdictional waters.

Section 402 of the CWA establishes a National Pollution Discharge Elimination System (NPDES) general permit process for point and non-point source discharges such as storm water discharges associated with construction activities. Such a permit would be required if construction activities disturb a land area of one acre or more and discharge storm water from the construction site to waters of the U.S. The DOH-CWB implements this NPDES for the State.

Section 404 of the CWA requires a permit for the discharge of dredged or fill material into a wetland, navigable water, or jurisdictional waters of the United States. The U.S. Army Corps of Engineers (USACE) issues a permit under these regulations.

**Executive Order 11988 Floodplain Management**
Executive Order 11988 requires federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of flood plains. It also requires agencies to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. The Environmental Protection Agency (EPA) has policies and procedures for implementing this Order, and each federal agency is responsible for implementing these procedures.

**Executive Order 11990 Protection of Wetlands**
Executive Order 11990 was issued to minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. This Order requires federal agencies, in their planning actions, to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided. The EPA has policies and procedures

for implementing this Order, and each federal agency is responsible for implementing these procedures.

**Executive Order 12898 Environmental Justice**
Executive Order 12898 (Environmental Justice) issued in 1994 is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Federal agencies need to identify and address disproportionately high and adverse environmental effects from an action on minority and low-income populations.

**Fish and Wildlife Coordination Act**
The Fish and Wildlife Coordination Act was enacted to protect fish and wildlife when federal actions result in the control or modification of a natural stream or body of water. The federal agency needs to take into consideration the effect that water-related projects would have on fish and wildlife resources, take action to prevent loss or damage to these resources, and provide for the development and improvement of these resources. This regulation is administered by the FWS and the National Marine Fisheries Service, as appropriate.

**American with Disabilities Act**
The Americans with Disabilities Act (ADA), signed into law in 1990 and later amended with changes in 2009, is a wide-ranging civil rights law intended to make American Society more accessible to people with disabilities, and prohibits discrimination based on disability under certain circumstances. The ADA is divided into five titles that cover: 1) employment; 2) public services; 3) public accommodations; 4) telecommunications; and 5) miscellaneous items. The State DOFAW would need to comply with these regulations by having new project improvements (e.g., pathways) meet the 2010 ADA standards for accessible design.

## 1.4 STEPS IN THE ENVIRONMENTAL REVIEW PROCESS

### *Early Consultation and Data Gathering*

HAR Section 11-200.1-18 requires that an agency must consult with agencies and individuals that might have jurisdiction or expertise with respect to the proposed action. Early consultation is considered an important part of the environmental review process – the goal is the gathering of information, data, and public concerns. A preliminary description of the project was circulated to agencies and individuals in April 2023, and phone consultations were conducted with permitting agencies as necessary. For a detailed description of the early consultation component of this project, see Chapter 6, *Individuals, Community Groups, and Agencies Consulted,* of this EA. Copies of the written comments are included in Appendix A.

Following preliminary consultation in April and May 2023, it appeared that environmental review of the proposed wetland restoration would be covered under the existing fishpond restoration and maintenance activities. However, after further review and consultation, it was determined that project activities within the shoreline setback area would require a variance, and the Shoreline Setback Variance would trigger the need for an EA (Hawai'i Planning Department Rule 11-10). While only those activities within the shoreline setback area trigger compliance with HRS Chapter 343, the entirety of the proposed action is evaluated in this EA (HAR Section 11-200.1-10).

### *Community Involvement*

Several meetings were held with community group Ka ʻOhana O Honuʻapo during review of the project to understand the evolution of the project and community context and knowledge. Community fliers and notifications were posted regarding issuance of this draft EA. Past restoration efforts and a summary of the work completed for the 2011 Restoration Plan are reviewed in Sections 2.1 and 6.2 of this EA.

### *Circulation of the Draft Environmental Assessment*

Following completion of this Draft EA, the environmental document will be submitted to the State of Hawaiʻi, Office of Planning and Sustainable Development, Environmental Review Program (ERP).[1] The ERP will notify government agencies and the public when the Draft EA is available for review. The announcement will be made in a bi-monthly bulletin called *The Environmental Notice*, which is available in print and online. Publication in *The Environmental Notice* marks the beginning of a 30-day comment period during which government agencies and the public can review and comment on the environmental document and its findings. For the proposed project, DLNR will submit a Notice of Determination with the Draft EA to the ERP with an Anticipated Finding of No Significant Impact (AFONSI) (HAR Section 11-200.1-11).

### *Final Environmental Assessment and Finding of No Significant Impact*

After the 30-day review period, the DLNR will consider all comments and incorporate necessary changes into a Final EA. It is anticipated the Final EA will support a Finding of No Significant Impact (FONSI), if appropriate. The publication of the Notice of Availability of the Final EA-FONSI in *The Environmental Notice* initiates a 30-day judicial challenge period under HRS Section 343-7(b).

If the proposing agency reviews public comments on the Draft EA, and the public comments indicate that the proposed action could in fact have significant effects, the agency would prepare a Final EA supporting an Environmental Impact Statement Preparation Notice (EISPN) determination.

[1] Previously named the Office of Environmental Quality (OEQC).

# 2 PROJECT DESCRIPTION

The proposed wetland restoration project improvements are based on the *Wetlands Habitat Restoration Plan for Honu'apo Estuary* (Restoration Plan), prepared by the Sustainable Resources Group International, Inc. in 2011. The 2011 Restoration Plan is a publication of the County of Hawai'i in partnership with Ka 'Ohana O Honu'apo, supported by the Hawai'i Office of Planning, Coastal Zone Management Program, and the National Oceanic and Atmospheric Administration (NOAA).

## 2.1 ENVIRONMENTAL SETTING

### PROJECT LOCATION

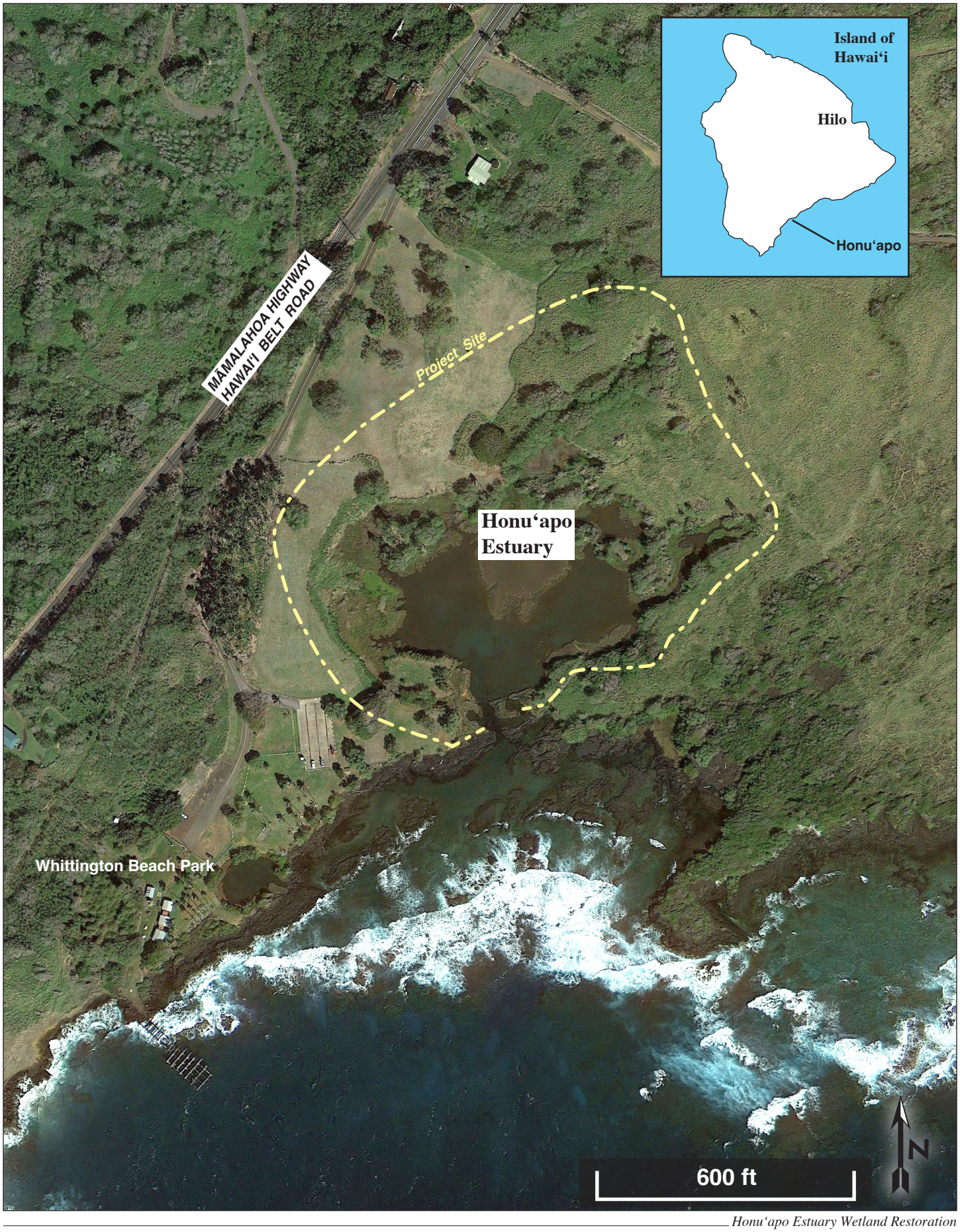
The Honu'apo Estuary Wetland Restoration project site includes ±8-acres of estuary and marsh habitat located along the coast in the Honu'apo ahupua'a, Ka'ū District, on the Island of Hawai'i. The project site is located at County of Hawai'i Whittington Beach Park (aka Honu'apo Park) and expanded Honu'apo lands, an approximately 225-acre area (see Figure 1). The project site is located on a portion of Tax Map Key: (3) 9-5-014:007, one of several parcels that comprise the entirety of Honu'apo Park. There are five Land Commission Award parcels (kuleana lands[2]) and one school grant parcel within Honu'apo lands, which are excluded from the park property. There are several kuleana parcels located within or partially within the project site. The project site parcel (and excluded parcels) is shown on Figure 2.

### EXISTING SITE CONDITIONS

The Honu'apo estuary is a wetland complex with three distinct wetland types: subtidal, intertidal, and palustrine. In the subtidal estuary, water levels and the wetted surfaces vary with tides, as it is directly connected to the ocean via a natural channel cut into the lava. The intertidal wetlands are inundated by tides on a nearly daily basis by normal high tides. This wetland type contains small stretches of exposed mudflats, an area with dense low growing emergent grasses, and backwater areas with dense vegetative cover. The palustrine wetland is located above the intertidal zone and is not submerged except during wave run-up and following heavy rain events. Most of this wetland type is covered with dense, high growing, non-native plants.

There are no natural freshwater streams or channels that flow into the estuary. There are freshwater springs and seeps (punawai) that enter the wetland along its margins and in the estuary, creating small pockets of freshwater, with brackish water in the main body of the estuary, and sea water near its mouth at the ocean.

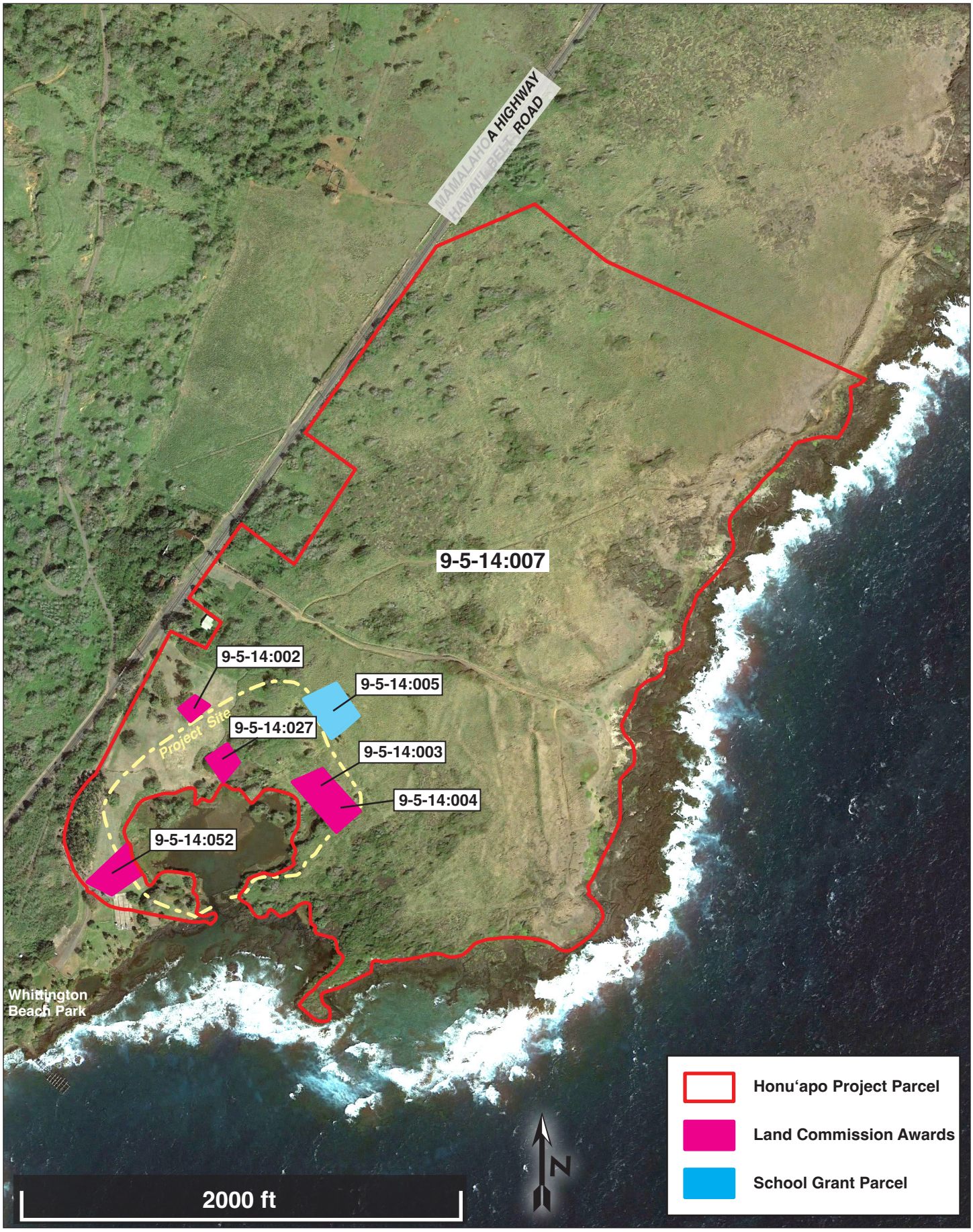
[2] Kuleana lands refer to small parcels of land granted to Native Hawaiians under the Kuleana Act of 1850. This act aimed to provide land ownership and rights to those who could prove their ancestral ties to the land and had actively cultivated it. These lands were typically small plots used for taro patches, house lots, and other subsistence activities. See Section 4.12 below for additional discussion.




*Honu'apo Estuary Wetland Restoration*

SOURCE: Google Earth 2023

**Figure 1**
Project Location Map




*Honu'apo Estuary Wetland Restoration*

SOURCE: County of Hawai'i Geographic Information System Maps 2023;
County of Hawai'i Tax Map Key (TMK) Maps

**Figure 2**
Project Site Parcel

The wetland pond has historically been used as a fishpond (loko iʻa), and is currently functional. Portions of the wall (kuapā) were damaged by tidal currents and storms in the past, but were reconstructed over the past few years using traditional Hawaiian methods. Although the existing estuary wetland system supports a diversity of endemic species, altered hydrology, sedimentation, and invasion by non-native plants and animals has resulted in decreased wetland function and habitat for native resident and migratory birds and other native animal life. Further, the presence of feral cats and mongoose predators in the larger park area is believed to be a primary cause of the low number of native and migratory birds using the estuary.

### *Project Site Access*

Access to the project site wetland area is via the Whittington Beach Park access road off Māmalahoa Highway (Hawaiʻi Belt Road). There are two parking areas at Whittington Beach Park, and direct access to the wetland area is on foot.

### *Surrounding Land Uses*

The project site is bounded by open space uses of Honuʻapo park lands to the north, east, and west, and the Pacific Ocean to the south. Whittington Beach Park facilities are southwest of the project site. The nearest town to Honuʻapo is Nāʻālehu, which is approximately 3 miles to the southwest.

## SITE HISTORY AND RESTORATION PLANNING PROCESS

Honuʻapo was a coastal settlement dating back to at least the 1400-1500s. According to early accounts, the area featured a large village, fishpond, coconut grove, canoe landing, and heiau around the fishpond. The nearby slopes were farmed with sweet potato, dryland taro, bananas, wauke, arrowroot, and plantains. In 1870, the bay was deepened, and by 1881 a sugar plantation was established. A wharf built in 1910 made Honuʻapo a key port for Kaʻū's sugar exports. Though the plantation closed in 1973, sugarcane was grown until the Pahala Mill shut down in 1996. The plantation also maintained the pond and supported community camping. Afterward, the area was used for cattle grazing and became a dumping ground. Decades of using the area for sugar operations and cattle grazing caused the wetland complex and surrounding area to become impacted and overgrown with invasive species including seashore paspallum, California grass, and guinea grass. Cattle have trampled within the wetland, and a portion of the estuary was altered through landscaping and planting to create a Japanese garden, complete with walking bridge. The estuary and surrounding area also became a dumping ground for old car parts and trash.

In the early 2000s, the community learned that the owner/developer of the 225 acres surrounding the estuary had submitted plans to the County to build 18 luxury estates. Residents were concerned that the subdivision would limit access to the shoreline for local families and fishermen, endanger the remaining habitat, and spur further development. As a result, a group of committed local volunteers formed Ka ʻOhana O Honuʻapo to manage the park's expansion and restoration projects at Honuʻapo. In 2003–2004, volunteers spent numerous hours cleaning up the degraded wetlands and bay, including the removal of encroaching vegetation, which made the estuary wetland complex visible. In 2005, Hawaiʻi State and County governments, the non-profit community organization KOOH, the Trust for Public Land, the National Oceanic and Atmospheric Administration, the Kaʻū community, and other individual donors came together to protect the Honuʻapo property from development interests and purchased the site. It was set aside to the County of Hawaiʻi for Estuarine Land Conservation and Public Recreation purposes by Executive Order No. 4164 on July

13, 2006, which provided conservation status to the property to ensure its long-term protection and the opportunity for restoration of the unique estuarine wetland (Hawai'i County 2010).

The County's Department of Parks and Recreation (DPR) signed a Memorandum of Understanding (MOU) with KOOH on August 14, 2008 for a pilot project at Whittington Beach Park and expanded Honu'apo lands. The MOU allows KOOH to assist the County in maintaining current park facilities, and to plan for additional restoration and conservation activities and community park improvements, provided that the proper approvals and permits are obtained (Hawai'i County 2010). In 2010, the *Honu'apo Park Resources Management Plan* was completed and the *Wetlands Habitat Restoration Plan for Honu'apo Estuary* was prepared in 2011 as a framework for the restoration project.

### *Restoration and Community Participation*

The KOOH has completed restoration efforts in the Honu'apo wetland area since the 2011 Restoration Plan with the assistance of National Coastal Wetlands Conservations Grants, and small private grants from the National Environmental Education Foundation in 2021 and Ke Kai Ala Foundation in 2023. With the participation of KOOH Board and community members, the following summarizes restoration activities:

- KOOH Board and community volunteers donated over 600 hours to the park planning process related to the wetland restoration plan from 2013 - 2020.
- The KOOH obtained a Loko I'a permit[3] from the Office of Conservation and Coastal Lands (OCCL) in 2019 and started on-the-ground restoration efforts for the fishpond in March 2021. As of June 2025, KOOH and NGO[4] partner Hawai'i Wildlife Fund had hosted 59 coastal restoration workdays (Loko I'a, wetlands, beach cleanups) including over 1,280 total participants (including 502 youth), for an estimated 5,000+ hours of effort on this project.
- KOOH also installed five mongoose / rat traps in 2022 around the estuary to help protect the native birds working with Birds of Hawai'i Past Present.

KOOH wetland / fishpond restoration workdays have been hosted regularly since March 2021, focusing on rebuilding the rockwall (kuapā) and clearing out sediment and invasive vegetation from around the freshwater springs.

### *Federal Coastal and Estuarine Land Conservation Program*

Since a large part of the funding for the purchase of park property came from NOAA under the Coastal and Estuarine Land Conservation Program (CELCP), any wetland restoration activities need to be consistent with the program's guidelines. The CELCP is a program designed to protect coastal and estuarine areas "with important conservation, recreation, ecological, historical, or aesthetic values, or that are threatened by conversion from their natural or recreational state to other use." As described in the Resources Management Plan, public access and activities consistent with the

[3] The Ho'āla Loko I'a program is a streamlined permitting process for the restoration and maintenance of traditional Hawaiian fishpond systems.

[4] An NGO, or non-governmental organization, is typically a nonprofit entity that operates independently of government, and focuses on humanitarian or social issues.

conservation purpose of the grant (e.g., resource protection, restoration and enhancement, recreational activities) are allowed (Hawai'i County 2010).

## 2.2 DESCRIPTION OF THE PROPOSED ACTION

As described previously, the proposed wetland improvements are based on the 2011 Restoration Plan. The purpose of the project is to restore and enhance the Honu'apo wetland's form and function within the cultural context of the restoration of the traditional Hawaiian fishpond. The proposed restoration project includes two phases, including the following improvements:

*Phase I:*

- removal of invasive vegetation to improve water quality and quantity as well as habitat function
- creation of deepened water areas for improved habitat productivity and diversity
- revegetation with native plant species to provide natural site conditions for native endemic species

*Phase II:*

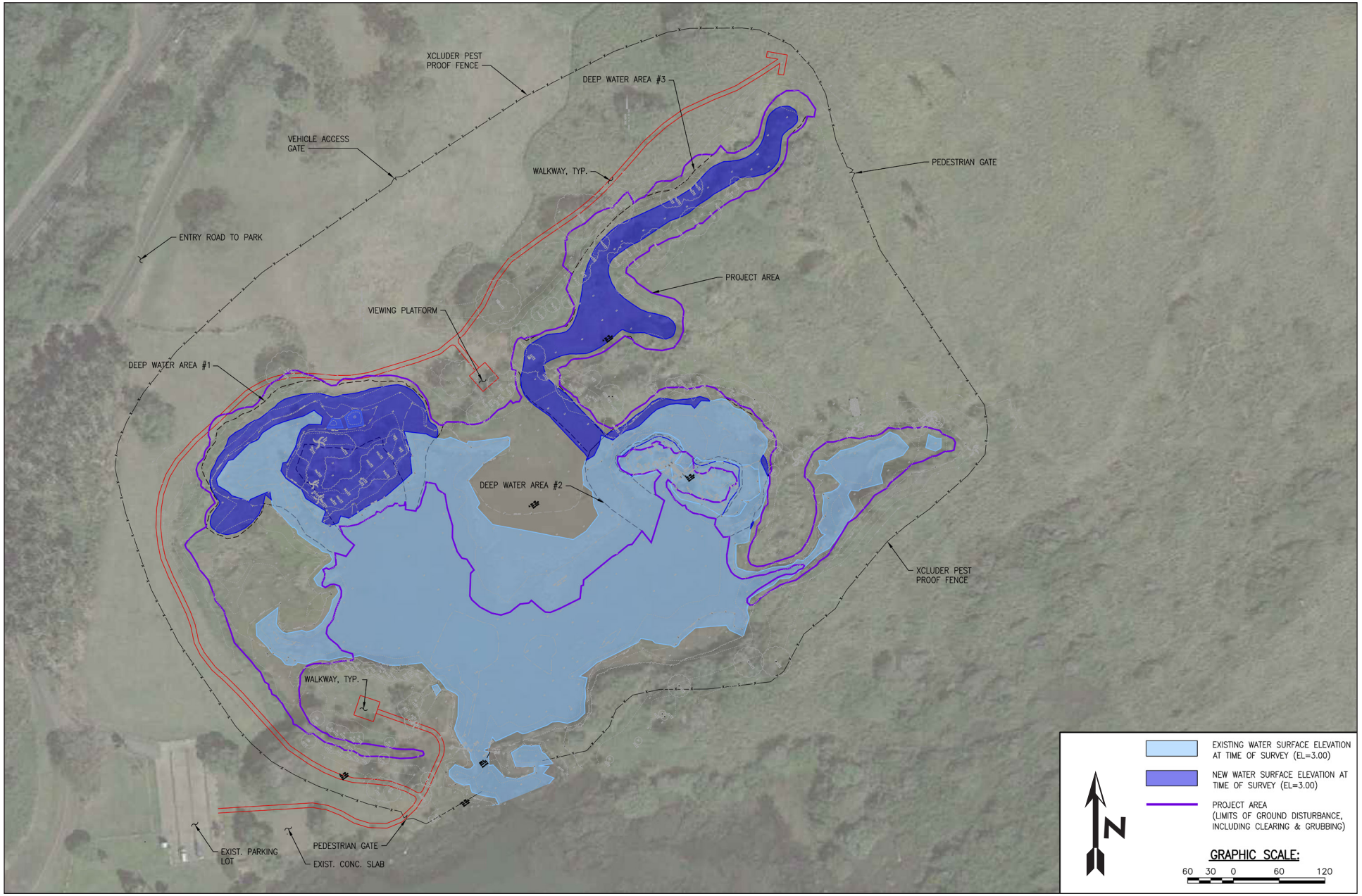
- installation of a predator proof fence
- installation of pedestrian gate and walkway with viewing platforms

### WETLAND RESTORATION PLAN

#### *Earthwork and Grading*

As shown in the conceptual development plan (see Figure 3), the topography of the intertidal zone would be graded to create two habitat types. The grading would include approximately 9,475 cubic yards of cut and 1 cubic yard of fill over a 2.32-acre area of the estuary.[5] Soil removed would be stockpiled for drying and taken to the appropriate county disposal site. Forage habitat for use by wading birds would be created on the mudflat areas that are currently covered with ground cover. The ground surface in these areas would be lowered to finished elevations that will result in frequent inundation by high tides. These modifications would be expected to increase productivity of food sources used by wading birds and prevent recruitment of invasive plants back onto the mudflats. Deep water pools would also be created by grading. These pools, which would remain perennial during all tides and are fed by fresh and sea water, would be expected to be favorable to the Hawaiian coot and other diving and dabbling birds (Hawai'i County 2011).

[5] Volume and area of cut and fill and grading are estimates and may vary slightly across project permitting and resource documents.

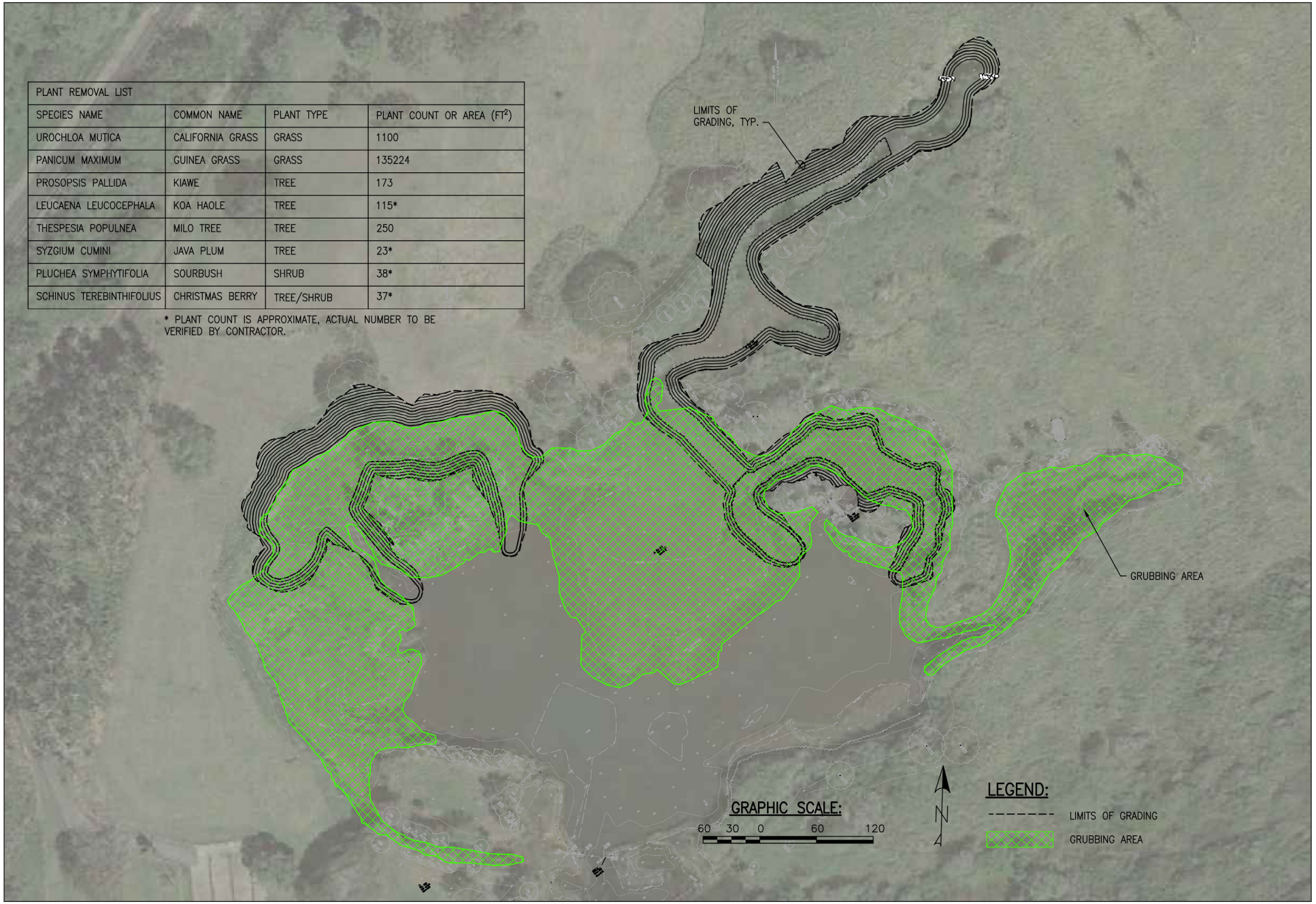



SOURCE: Bow Engineering 2023

*Honu'apo Estuary Wetland Restoration*

**Figure 3**

General Site Plan




*Honu'apo Estuary Wetland Restoration*

SOURCE: Bow Engineering 2024

**Figure 4**

Vegetation Removal Plan

### *Removal of Invasive Plants and Revegetation with Native Species*

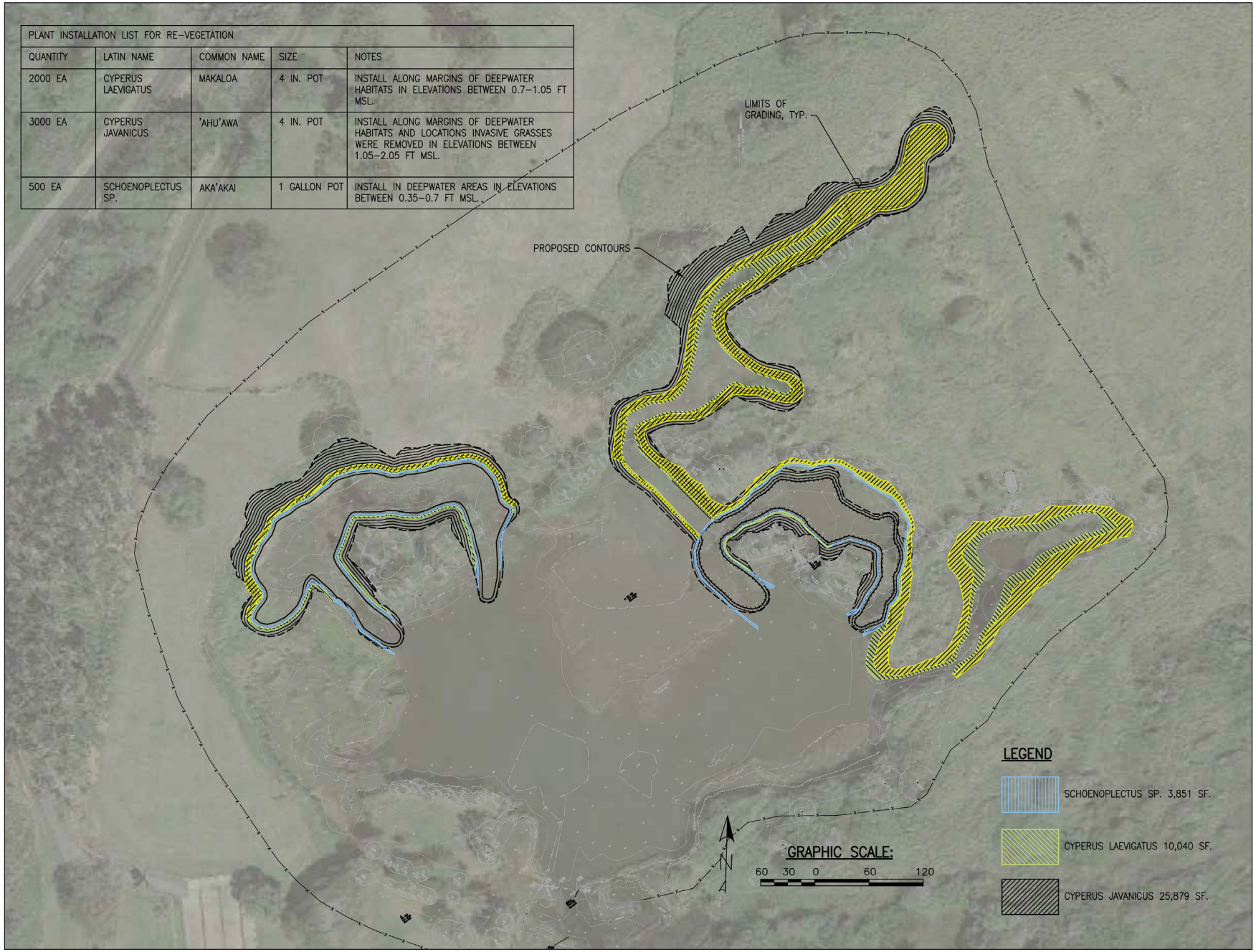
The proposed restoration improvements would include the gradual removal of invasive vegetation within the wetland area and restoring it with native vegetation. Invasive plants can degrade habitat quality by encroaching and choking wetlands. Tall grass provides cover for predators in areas surrounding the wetland. Existing invasive vegetation, including non-native grass species such as California grass and seashore paspalum, would be removed to increase foraging habitat (see Figure 4). The invasive tree kiawe would be removed from the wetland margins in order to restore freshwater flow to the wetland. Removal of the kiawe would also reduce roosting sites for cattle egret that may prey on Hawaiian stilt eggs and chicks. Other invasive plants would be removed from the mudflats to increase foraging habitat. Invasive plants to be removed include the following, but not limited to:

- California grass
- Guinea grass
- Kiawe
- Koa haole
- Milo
- Java plum
- Sourbush
- Christmas berry

Native or endemic vegetation planned for the proposed wetland enhancement project includes species that are already on-site, those of short stature, and those wetland plants that are known to provide foraging and nesting resources for target bird species. If the species does not currently occur on-site, only native species known to occur in the local area would be used. The selected species are suitable for soil and water salinity under wetland build out conditions and, once established, do not require long-term maintenance. Since tall plants provide cover for predators, removal or mowing of some native plants with tall stature may be necessary temporarily to help control the predator population. Native plant species present within the wetland area include makaloa, and the native ʻakaʻakai or nānaku is found in the intertidal and palustrine zones near the freshwater seeps and springs. The ʻahuʻawa is a flood tolerant native plant that can be used along water banks to control erosion and is used as nesting material and shelter by native waterfowl (see Figure 5 for the re-vegetation plan).

### *Predator Control*

Predation by feral cats, mongoose, and rats is a serious threat to all waterbirds and sea turtles, and especially to their nests; these animals prey on eggs and chicks. Ongoing predator control to protect the endangered endemic and migratory bird species using the wetland would continue in conjunction with the installation of a predator proof fence constructed using New Zealand's conservation design technology. The project site plan (see Figure 3) shows the general location for the fence, including a pedestrian gate and walkway with viewing platforms. The actual location of the fence may vary, and would be determined based on site conditions and other factors.




*Honu'apo Estuary Wetland Restoration*

SOURCE: Bow Engineering 2024

**Figure 5**
Re-Vegetation Plan

### *Public Use and Education*

The proposed project includes a pedestrian gate through the predator proof fence, walkway, and viewing platforms that may be constructed in later phases of the project. Similar to the predator fence, the actual location of the walkway and viewing platforms could vary. The proposed restoration project would provide increased opportunity for public eduation on coastal wetland ecosystems. Ka 'Ohana would have responsibility of designing interpretive and educational displays, and managing related educational or volunteer programs.

### *Long-Term Management*

Long-term adaptive management strategies for the wetland restoration project are designed to ensure on-going functionality following restoration and enhancement activities. As a partner in park management, a role of KOOH would be to liaison with the County and coordinate on-going community involvement to sustain the benefits of the wetland restoration project. Types of activities requiring long-term maintenance include: vegetation management, invasive species control, and predator control. The use of native species as part of the revegetation component would not require post planting maintenance. As part of its regular park maintenance activities, the County Department of Parks and Recreation can provide vegetation control in the form of on-going kiawe removal and mowing of the upland vegetation. Predator control services may be contracted out to a private company. When and if the predator proof fence is installed, it would require routine inpsection, monitoring, and potential eradication of predators inside of the fence. Project plans are being updated to construct the fence up to the water's edge and into the water so predators cannot get around it and enter the wetland. Community members would continue to play a key role in the future of Honu'apo park lands, including the wetland. Volunteer participation would be needed for on-going wetland maintenance (e.g., work parties), monitoring, and education (County of Hawai'i 2011).

**Site-Specific Best Management Practices**

Due to the proximity of nearshore ocean waters, the project could present increased potential for water quality impacts during construction or as stockpiled materials are incrementally removed. The proposed project would include site-specific Best Management Practices (BMPs) to be implemented during project construction and during removal of stockpiled material to minimize erosion and potential impacts to water quality. The BMPs would include but would not be limited to the USFWS recommended standard BMPs[6] regarding sedimentation and erosion in aquatic environments:

1. Authorized dredging and filling-related activities that may result in the temporary or permanent loss of aquatic habitats should be designed to avoid indirect, negative impacts to aquatic habitats beyond the planned project area.
2. Turbidity and siltation from project-related work should be minimized and contained within the project area by silt containment devices and curtailing work during flooding or adverse tidal and weather conditions. BMPs should be maintained for the life of the construction period until turbidity and siltation within the project area is stabilized. All project construction-related debris and sediment containment devices should be removed and disposed of at an approved site.
3. Mechanical sediment removal and dredging will be done in accordance with the construction plans, specifications, and shall follow all BMPs described in the plans. BMPs that may be used to prevent the spread of sediment and construction debris

[6] Since no activities are proposed in the nearby marine environment, several BMPs from the USFWS standard recommendations were not included.

caused by in-water work include the use of turbidity/silt curtains, coffer dams, sandbags, floating booms, etc. Inspection of BMPs before in-water dredging shall be performed daily with periodic visual observations of water quality during active in-water work throughout each workday. All work shall be stopped if any turbidity plumes or failures in BMPs are discovered. Work may only resume after BMPs are restored and determined to be functional. In addition to BMPs, if in-water work can be performed during low, incoming tides, then that would help to minimize the impact to the surrounding waters of the estuary.

4. Mechanical vegetation removal and grubbing will be done in accordance with the construction plans, specifications, and shall follow all BMPs described in the plans. BMPs that may be used include sediment rolls, sediment fences, sandbags, and dust fences. During this work, BMPs will be installed in the surrounding down sloping areas to contain any erosion or sediment runoff due to disturbed and exposed areas. Invasive vegetation removal will not affect the health of the surrounding environment. Until revegetation of the area is established, BMPs shall remain in place to prevent any erosion or sediment runoff during storm events.
5. All project construction-related materials and equipment (dredges, vessels, backhoes, silt curtains, etc.) to be placed in an aquatic environment should be inspected for pollutants including but not limited to; marine fouling organisms, grease, oil, etc., and cleaned to remove pollutants prior to use. Project related activities should not result in any debris disposal, non-native species introductions, or attraction of non-native pests to the affected or adjacent aquatic or terrestrial habitats. Implementing both a litter-control plan and a Hazard Analysis and Critical Control Point plan (HACCP - see http://www.haccp- nrm.org/Wizard/default.asp) can help to prevent attraction and introduction of non-native species.
6. Project construction-related materials (fill, revetment rock, pipe, etc.) should not be stockpiled in, or near aquatic habitats and should be protected from erosion (e.g., with filter fabric, etc.), to prevent materials from being carried into waters by wind, rain, or high surf.
7. Fueling of project-related vehicles and equipment should take place away from the aquatic environment and a contingency plan to control petroleum products accidentally spilled during the project should be developed. The plan should be retained on site with the person responsible for compliance with the plan. Absorbent pads and containment booms should be stored on-site to facilitate the clean-up of accidental petroleum releases.
8. All deliberately exposed soil or under-layer materials used in the project near water should be protected from erosion and stabilized as soon as possible with geotextile, filter fabric or native or non- invasive vegetation matting, hydro-seeding, etc.

These BMPs will be refined in accordance with County of Hawai'i regulatory requirements as part of the permitting process.

### *Project Phasing and Construction Cost*

The construction of the proposed project would require the following tasks: installation of erosion control BMPs, equipment mobilization and demobilization, vegetation removal, dredging, slope grading, loading of soil into trucks, and hauling soil for stockpiling or disposal. Project construction would include the use of heavy machinery such as excavators, bulldozers, backhoes, and skid steer loaders for mechanical grading around the pond edges and to deepen areas with accumulated sediment.

The project would be phased based on funding availability. The estimated construction costs for completion of the wetland restoration project are approximately $2.5 million, including mobilization and contingency funds.

## 2.3 PERMITS AND APPROVALS REQUIRED OR POTENTIALLY REQUIRED

The regulatory permits and approvals necessary to implement the proposed action are listed below:

### *Federal Permits*

- NEPA – anticipated USFWS NEPA Categorical Exclusion
- Endangered Species Act, Section 7 Consultation – initiated with the U.S. Fish and Wildlife Service (May 2025)
- National Historic Preservation Act, Section 106 Consultation – initiated by the U.S. Army Corps of Engineers with the State Historic Preservation Division (May 2025)
- Department of the Army (DA) Permit, Clean Water Act, Section 404, and Rivers and Harbor Act, Section 10 – submitted to U.S. Army Corps of Engineers
- Clean Water Act, Section 401 – Implemented by the State of Hawai‘i, Department of Health, Clean Water Branch

### *State of Hawai‘i*

- HRS Chapter 343 – The DLNR, Division of Forestry and Wildlife is the accepting agency for the proposed action and has the authority to determine if the EA is adequate and whether a FONSI is appropriate
- HRS Chapter 6E, Historic Preservation Review – DLNR, Historic Preservation Division
- Conservation District Use Application (CDUA) – DLNR, Office of Conservation and Coastal Lands (OCCL), Statewide Programmatic General Permit and Programmatic Agreement for the restoration, repair, maintenance, and reconstruction of traditional Hawaiian fishpond systems across Hawai‘i; Loko I‘a Permit HA-19-02: Honu‘apo
- Coastal Zone Management Act Consistency Determination - Department of Business, Economic Development and Tourism, Office of Planning
- State Section 401 Clean Water Act – The project should be covered under the Blanket Section 401 Water Quality Certification (WQC) for certain DA Nationwide Permits (WQC1092)
- National Pollutant Discharge Elimination System (NPDES) General Permit for Construction Stormwater Activities - Department of Health
- Grading/Grubbing/Stockpiling – Hawai‘i County Public Works Department – Engineering Division

- Building Permit - A building permit will be needed from the Hawai'i County Public Works Department – Building Division if a predator control fence over six feet tall and/or a boardwalk is constructed as part of the wetland restoration.
- Noise Permit – State of Hawai'i, Department of Health
- Special Management Area Permit (SMA) – Submittal to the Hawai'i County Planning Department, approval by the County Planning Commission
- Shoreline Setback Variance – Some of the project activities (e.g., grubbing, grading, and portions of the fence line) would occur within the Shoreline Setback Area, which would require a Shoreline Setback Variance from the County of Hawai'i, Department of Planning and Permitting
- Flood Ordinance Compliance - approval by the Hawai'i County Public Works

## JURISDICTION AND MANAGEMENT AUTHORITY

Multiple organizations and agencies have jurisdiction and management authority for activities related to the proposed wetland restoration project at Honu'apo Estuary (Hawai'i County 2011):

- *County of Hawai'i, Department of Parks and Recreation*: The County DPR is the managing entity of Honu'apo Park. The County DPR provides equipment, maintenance of existing park facilities, consultation, and advice.
- *County of Hawai'i, Planning Department*: The County Planning Department has adopted the Ka'ū Community Development Plan (2017), which guides county policy and actions in the project area. The Planning Department is also responsible for implementing the Coastal Zone Management program for the county (HRS Chapter 205A).
- *State of Hawai'i.* The State of Hawai'i, Board of Land and Natural Resources, approved purchase of Honu'apo park lands in 2005, and in 2006, the land was set aside to the County of Hawai'i for Estuarine Land Conservation and Public Recreation purposes by Executive Order No. 4164 (signed by the Governor on July 13, 2006). The State of Hawai'i has jurisdiction over submerged lands within its boundaries, including those beneath navigable waters and tidal waters. This includes Honu'apo Estuary.
- *U.S. Fish and Wildlife Service*: The USFWS Conservation Partnerships Program provides technical and financial assistance to KOOH on wetlands restoration planning and management.
- *National Oceanic and Atmospheric Administration*: NOAA provided technical and funding assistance to KOOH on wetlands restoration planning and management. Restoration activities need to be consistent with the terms of the Coastal and Estuarine Land Conservation Program, a NOAA program that provided funds to purchase the park property.
- *Ka 'Ohana O Honu'apo*: KOOH has a formal Memorandum of Understanding with the County DPR to care for, restore, and manage Honu'apo Park.

It is anticipated that wetland restoration work would be accomplished primarily by KOOH and partners including NOAA, USFWS, and State and County governments.

# 3 DESCRIPTION OF THE AFFECTED ENVIRONMENT, ANTICIPATED EFFECTS, AND PROPOSED MITIGATION MEASURES

The intent of this chapter is to describe the existing physical and social environment that is affected by the proposed action. As defined in HAR Section 11-200.1, Environmental Impact Statement Rules, potential project impacts or effects may include primary and secondary impacts, in addition to cumulative impacts:

- A "primary impact" or "direct impact" means impacts or effects that are caused by the action and occur at the same time and place.
- A "secondary impact" or "indirect impact" means an impact or effect that is caused by the action and occurs later in time, but is still reasonably foreseeable. An indirect effect may include a growth-inducing effect and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air, water, and other natural systems, including ecosystems.
- A "cumulative impact" means the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (HAR Section 11-200.1-2).

Potential impacts that may result from implementation of the proposed action and mitigation measures to minimize the adverse impacts are described below.

## 3.1 GEOLOGY, TOPOGRAPHY, AND SOILS

### *Geology*

The Island of Hawai'i was formed by volcanic activity, with Honu'apo situated on relatively young lava flows from Mauna Loa. The coastal plain in this area is narrow and mostly flat, shaped by both 'a'ā and pāhoehoe lava, with pāhoehoe being more prevalent. 'A'ā lava features a solid core encased between two gravely clinker[7] layers, while pāhoehoe is distinguished by its smooth, ropy surface. Seismic activity and volcanic eruptions along the Ka'ū coast have caused both uplift and subsidence in various locations. The Honu'apo wetland likely developed as a depression caused by such subsidence. Archaeological findings suggest that early Hawaiians used the estuary as a fishpond, indicating that the natural depression formed by seismic events was later modified by human activity (Hawai'i County 2011).

### *Topography*

The topography of the Honu'apo area is characterized by a rocky coastal plain. Honu'apo Park lies at a low point along the coast; approximately 1,000 feet inland, the terrain begins to rise, ascending into moderate to steep slopes up the flank of Mauna Loa (Hawai'i County 2011). The topography at the project site is relatively level, with elevations on the project site ranging from near sea level up to approximately 19 feet Mean Sea Level (MSL) in the mauka (upland) portions of the site.

[7] Clinkers are the loose fragments that make up the surface of flows that are formed as pasty lava is pulled apart by shearing.

### *Soils*

The Natural Resources Conservation Service (NRCS) classifies the soils at the project site as predominantly Kanohina-Lava flows complex, 2 to 10 percent slopes (Unit 734); with Lava flows, pāhoehoe, 2 to 20 percent slopes (Unit 12) along the mouth of the estuary and along the coast; and a small portion of Kanohina-Lava flows complex, 10 to 20 percent slopes (Unit 539) (NRCS 2024).

Soil layers on top of the ʻaʻā and pāhoehoe lava is intermittent across the project area. The depth of soil in the larger project area range from a few inches thick near the coast to several feet within a few isolated locations in the wetland complex. In pockets along the shoreline, organic and inorganic material deposited by wind and by vegetation fills in the depressions and acts as grow media for plants in the otherwise harsh coastal environment (Hawaiʻi County 2011).

Based on soil data collected for the 2011 Restoration Plan, soils in the wetland complex appear to be developed under hydric conditions and are classified as organic. An approximate 1.4-acre portion of this organic soil extends from the mauka (toward the mountain) side of the complex into the estuary proper, forming a delta-like feature. Approximately half of this zone is slightly submerged and/or saturated during high tides. Along the upper margins of the wetland, there is evidence of fill in the form of gravel and larger rock materials that appear to have been pushed, possibly during sugar cane activities. These fill areas are likely remnants of historic land use on the parcel, and may have buried wetland soils or filled in open water pockets. The upland zone immediately surrounding the wetland is moderately sloped to near flat with numerous rocks extended above the soil layer (Hawaiʻi County 2011).

A soil screening was conducted for the Honuʻapo Estuary Restoration project on June 20, 2023, to determine what contaminants may be present in areas planned for grading and dredging. Soil was sampled and analyzed to identify the presence (if any) of contaminated soil remaining from the historic sugar plantation era (late 1800s to early 1900s), as well as more recent impacts caused by development in upland areas. Soil sample areas were chosen for soil collection based on the project scope and project area of the proposed excavation and dredging. Preconstruction soil sampling was conducted prior to any ground disturbing activities. In summary, volatiles, metals, and dioxins were detected in the soils from at least one sampled area; however, concentrations were well below the Department of Health (DOH) Tier 1 Environmental Action Levels (EALs) for reuse as unrestricted fill. PCBs and Organochlorine Pesticides were not detected in any of the sampled areas. For additional details regarding soil sampling results, see the Soil Sampling Characterization Report (August 2023) included as Appendix C.

### *Agricultural Soils*

Based on soil suitability and extent, the State of Hawaiʻi, Department of Agriculture has established the Agricultural Lands of Importance to the State of Hawaiʻi (ALISH) system to identify areas of prime farmland. The ALISH system classifies three types of land suitable for agriculture: Prime Lands, Unique Lands, and Other Lands. While there are designated Prime Lands located on the southwestern portion of Whittington Beach Park, the project site is not located on designated agricultural lands of importance (Hawaiʻi Office of Planning 2024).

## IMPACTS AND MITIGATION MEASURES

The project involves grading within the estuary, including approximately 9,475 cubic yards of cut and 1 cubic yard of fill over a 2.32-acre area of the estuary (see Appendix B, Drawings C-2.00 to 2.02 for grading plans). There would be a short-term increase in soil erosion during construction since soil excavation and slope grading associated with construction of the proposed project would result in the exposure of bare soil to potential erosion. All earthwork and grading operations would be conducted in compliance with dust and erosion control requirements of Hawai'i County Code Chapter 10, Erosion and Sedimentation Control. Because the project would include grading (cutting into the earth) of more than 100 cubic yards, grubbing (mechanical clearing of the surface without cutting into the ground) of more than one acre in a year, and stockpiling of material exceeding 500 cubic yards, a Grading / Grubbing / Stockpiling Permit would be required from the Hawai'i County Public Works Department, Engineering Division. The removal of the soil and stockpiling of the materials would include slope stabilization measures that would mitigate transport to the adjacent wetland areas.

The proposed action includes a site-specific Best Management Practices plan developed as part of the project to minimize erosion and sedimentation during construction, as outlined in Section 2.2 of this EA. Most of the areas are dry during low tides, so any excavation work can be planned to occur during these favorable tides, which would minimize the spread of sediment plumes in the water. During site grading and invasive vegetation removal, sediment rolls and dust fences would be used to contain any disturbed areas on land. In-water BMPs like turbidity curtains, sand bags, and booms would be used to isolate and contain in-water work areas, as necessary. No dredging would take place below the existing substrate; only accumulated sediment and soils would be removed. Even though the work would be most efficient using large excavators, volunteers and community work groups would also work without equipment and would work "by hand", which would minimize impacts due to turbidity and sedimentation. With implementation of these BMPs, and compliance with Hawai'i County regulations, the proposed project would not result in a significant impact due to soil erosion or off-site sediment transport. For a discussion of stormwater erosion and sedimentation, see Section 3.2, *Hydrology and Water Quality*.

While the Soil Sampling Characterization Report found that no contaminants of concern are present in the project site soils, it is recommended that additional samples be collected and analyzed from soil stockpiles during construction to further verify the results presented in the report to determine the appropriate soil disposal or re-use parameters. Following verification of soil sampling results, no significant impacts from mobilization of hazardous soil contaminants during construction would occur. The dredged material would be taken to a designated location on the larger Honu'apo property, outside of the Conservation District, for reuse, if approved by the County. Otherwise, the dredged materials would be transported to another property, landfill, or permitted recycling facility.

No long-term or cumulative adverse effects to geology, topography, or soils are anticipated with implementation of the proposed action.

## 3.2 HYDROLOGY AND WATER QUALITY

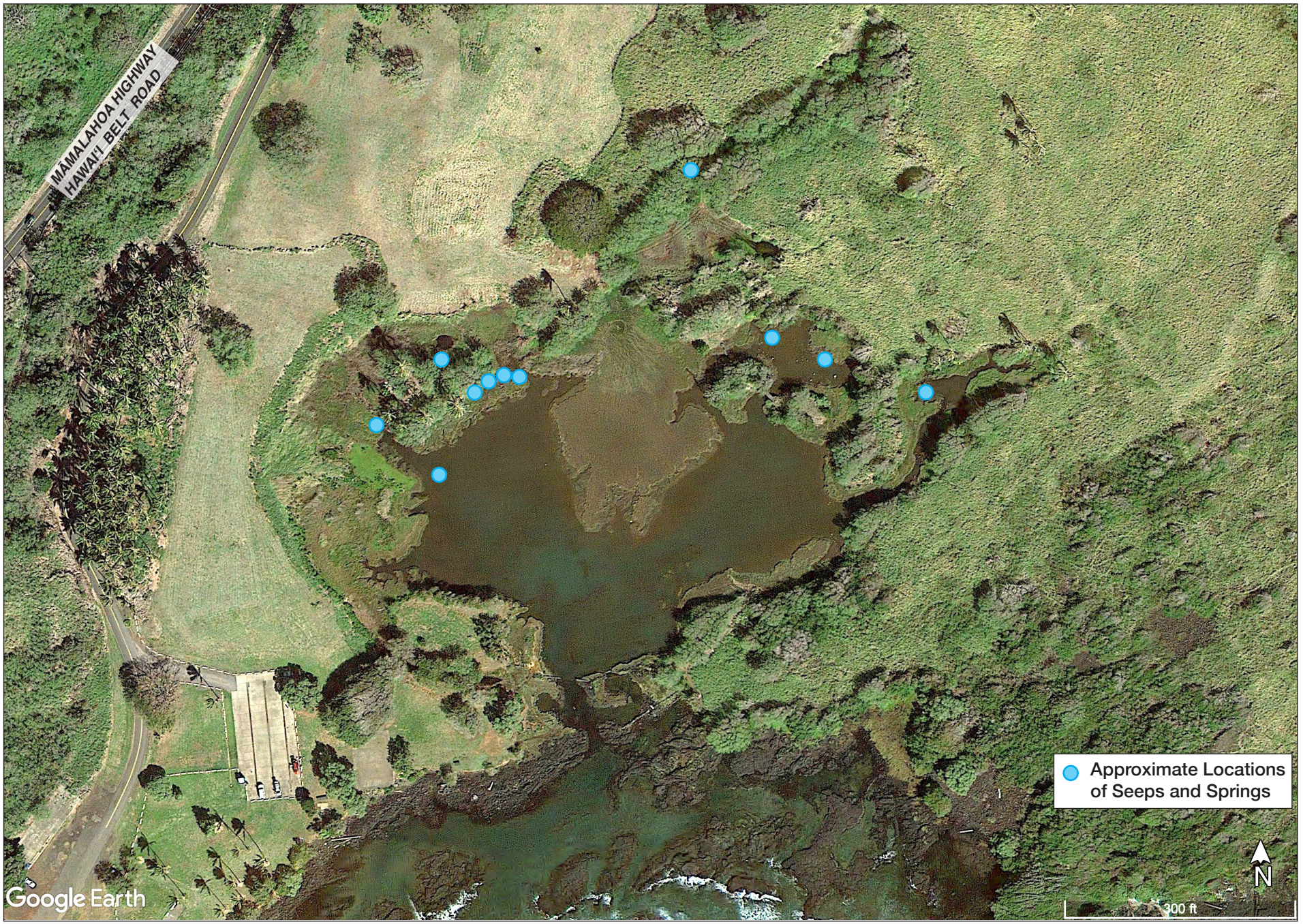
### *Hydrology, Surface Waters, and Drainage*

Lava tubes, fractures, and contact zones between different lava flows are features of the geologic substrate that stretches from the crest of the Mauna Loa volcano down to the coast. These features give groundwater preferential flow paths. Higher rainfall levels in upland regions replenish groundwater, which then travels along these flow paths to coastal regions where it either emerges as springs and seeps at the ground surface or offshore in the ocean. The coastal zone of the Kaʻū District is home to anchialine pools, which are brackish water ecosystems located in coastal zones that fluctuate with the tide but do not have any visible connection to the sea (Hawaiʻi County 2011).

The Honuʻapo Estuary is situated within Hīlea Gulch watershed that spans roughly 49.2 square miles, from an upper elevation of 9,600 feet down to the watershed outlet at the estuary (DAR 2008). Runoff from the uplands does not seem to be directly transported to the estuary by a drainage channel. However, high-magnitude rainfall events have historically caused sheet flow runoff from the watershed's upper slopes, flooding the former town site and sugar mill as well as the estuary (Hawaiʻi County 2011). The project site Kanohina-Lava lava rock type is highly permeable, allowing for excellent drainage but also resulting in very high runoff potential.

Direct rainfall and tidal waters influence the water levels at the Honuʻapo Estuary, while seeps contribute another source of water. There are no natural surface water streams or channels that flow into the estuary. It has been noted that freshwater from seeps and springs enters the wetland along its edges and in the estuary, forming tiny freshwater pockets that swiftly change to brackish water in the estuary's main body and to seawater close to its mouth. Observations during field investigations for the 2011 Restoration Plan recorded eleven seeps and springs along the edge of the estuary and another three discharging from the bed of the estuary (see Figure 6). The existence of vegetation that needs steady fresh water along the estuary's edge suggests that there are additional freshwater seeps and springs releasing water into the intertidal zones (Hawaiʻi County 2011).

Daily tide fluxes raise and lower the water surface of the Honuʻapo wetland complex to elevations that correspond to the minimum and maximum tides. While the estuary is never entirely drained, surface water outflow happens when the tide is falling. The flow of water between the ocean and the estuary is constricted between the two abutments of a concrete weir at the estuary outlet. As a result, fish, turtles, and other aquatic life are unable to enter or leave the estuary. Because of the falling water level and the continuous inflow of fresh water, the salinity concentration at and near the springs is probably at its lowest during falling tides (Hawaiʻi County 2011).




*Honu'apo Estuary Wetland Restoration*

SOURCE: Sustainable Resources Group International, Inc., *Wetland Habitat Restoration Plan*, 2011

**Figure 6**
Project Site Seeps and Springs

**Water Loss due to Evaporation and Transpiration.**[8] The summer months of May through September are when Honu'apo experiences the highest evaporation losses. Because of the tide fluxes and the mixing effect they have on the estuary's main body of water, the salinity concentration in the estuary probably does not surpass that of sea water. During the summer, when evapotranspiration[9] rates are at their highest, salinity concentrations may surpass sea water salinity levels in the palustrine wetland areas that are flooded and submerged during high tides, where no freshwater springs are present, and that are left isolated during low tides. Over time, evaporation and transpiration losses are influenced by the kind, density, and cover of plants within a watershed. The growth of non-native tree species can either increase or decrease evapotranspiration losses, which are a dynamic process (Hawai'i County 2011).

It is unknown how much transpiration occurs from plants that grow in and near the edge of the Honu'apo Estuary complex. The many non-native kiawe trees that border the wetland's edges have likely dipped into the groundwater layer that supplies the freshwater springs and seeps that empty into the estuary. These trees can transpire a large amount of water and act as pumps. Basic water budgeting supports the notion that removing the kiawe and replacing it with native plants that can tolerate drought without depleting the groundwater zone would allow more fresh water to flow through the existing seeps and springs (Hawai'i County 2011).

### *Wetlands*

A review of the USFWS National Wetland Inventory Map was completed to identify the presence of wetlands within the vicinity of the project. The Honu'apo Estuary is classified as Freshwater Emergent Wetland and Freshwater Pond, with the channel area classified as Riverine habitat (see Figure 7) (USFWS 2025).[10]

As characterized by the 2011 Restoration Plan, the Honu'apo estuary wetland complex contains three wetland types, including subtidal estuary, intertidal, and palustrine. Existing wetland types and acreages are depicted in Drawing C-1.02 of Appendix B. In the subtidal estuary, water levels and the wetted surfaces vary with tides, as it is directly connected to the ocean via a natural channel cut into the lava. The intertidal wetlands are inundated by tides on a nearly daily basis by normal high tides. This wetland type contains small stretches of exposed mudflats, an area with dense low growing emergent grasses, and backwater areas with dense vegetative cover. The palustrine wetland is located above the intertidal zone and is not submerged except during wave run-up and following heavy rain events. Most of this wetland type is covered with dense, high growing, non-native plants (Hawai'i County 2011). See Section 3.4, *Biological Resources* for a discussion of wetland habitat use by birds and aquatic species.

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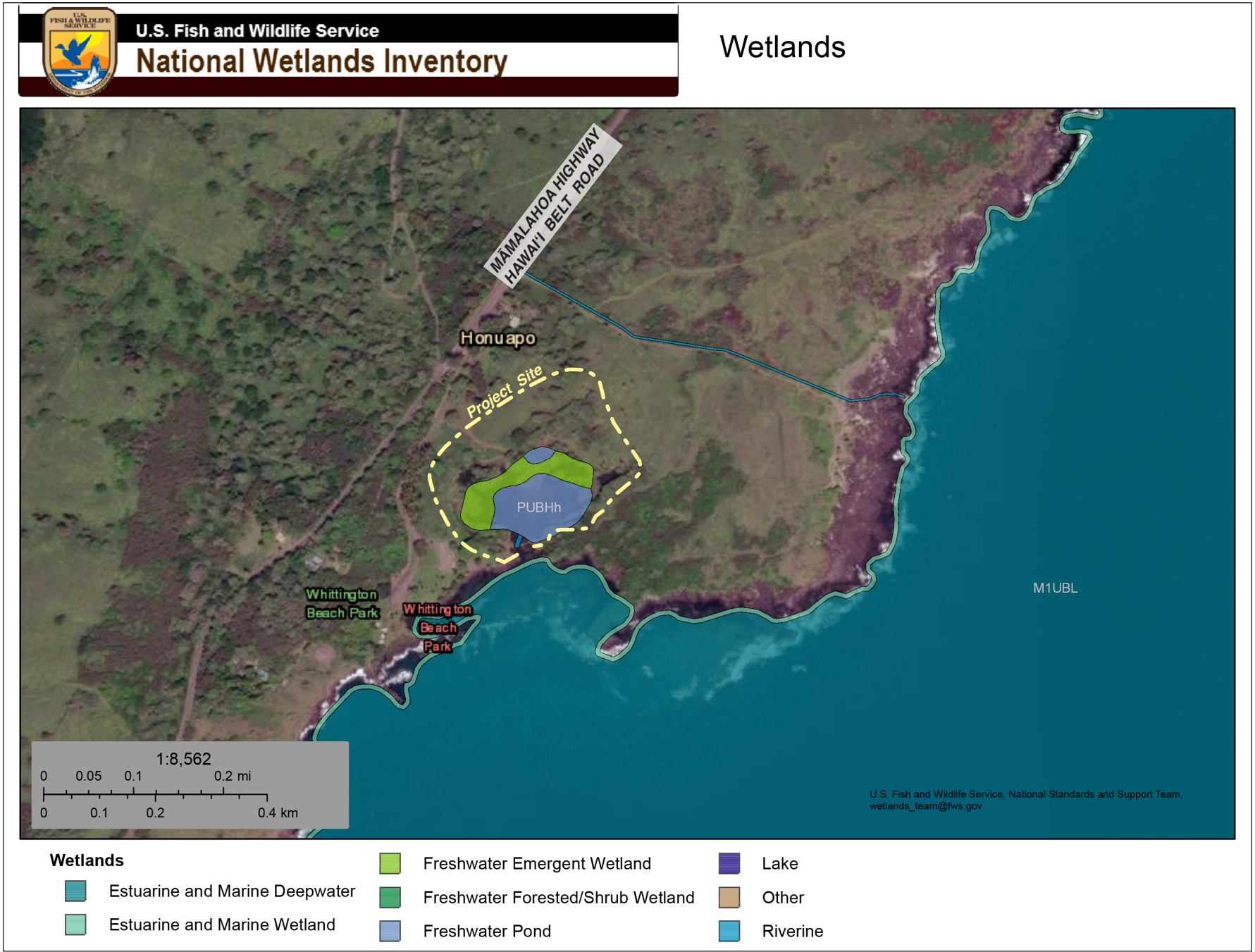
8 Evaporation is the process of turning from liquid into vapor. Transpiration is the process of water movement through a plant via its evaporation from the plant surface.

9 Evapotranspiration is the process by which water is transferred from the land to the atmosphere, by evaporation from the soil and other surfaces and by transpiration from plants.

10 The wetland inventory identifies 2.39 acres as Freshwater Emergent Wetlands (PEM1Ch), which is classified as Palustrine (P), Emergent (EM), Persistent (1), Seasonally Flooded (C), and Diked/Impounded (h). In addition, the 3.37 acres identified as Freshwater Pond (PUBHh) are classified as Palustrine (P), Unconsolidated Bottom (UB), Permanently Flooded (H), and Diked/Impounded (h). The 0.04-acre channel area identified as Riverine (R5UBH) habitat is classified as Riverine (R), Unknown Perennial (5), Unconsolidated Bottom (UB), and Permanently Flooded (H).




SOURCE: U.S. Fish and Wildlife Service, National Wetlands Inventory 2023

*Honu'apo Estuary Wetland Restoration*

**Figure 7**

National Wetlands Inventory Map

The estuary is brackish to saline, with the salinity concentration being a function of tide levels, rainfall inputs, and proximity to springs and seeps. Historically the surface area of the estuary was larger; reduction of its surface area is most likely due to vegetation encroachment, possible filling during sugar cane operations, and settling of organic debris from dead vegetation. It is estimated that there has been a two acre decrease in the amount of open water between historic photographs and circa 2010, as set forth in the 2011 Restoration Plan.

### *State Water Quality Standards*

Waters in the Honu'apo Estuary are classified by the DOH as "Inland waters, Class 2" (DOH 2014). The objective for Class 2 Inland waters is "to protect their use for recreational purposes, the support and propagation of aquatic life, agricultural and industrial water supplies, shipping, and navigation" (HAR Section 11-54-3(b)(2). These waters shall not act as receiving waters for any discharge which has not received the best degree of treatment or control compatible with the criteria established for this class.

Coastal waters in the vicinity of Honu'apo Bay are classified by the State Department of Health (DOH) as "AA" (DOH 2014). The objective of Class AA waters is that their waters remain in their natural pristine state as nearly as possible. According to HAR Section 11-54-3(c)(1), Class AA waters shall encounter "an absolute minimum of pollution or alteration of water quality from any human-caused source or actions."

### *Water Quality and Marine Environment*

The Clean Water Act (CWA), Section 303(d), requires states to submit a list of waters that do not attain or maintain applicable water quality numeric criteria, in addition to a priority ranking of impaired waters for Total Maximum Daily Loads (TMDL) development based on the severity of pollution and the uses of the waters. After the identification of water quality-limited waters is completed, states develop TMDLs at a level necessary to achieve the applicable state water quality standards. The CWA Section 305(b) requires states to describe the overall status of water quality statewide, and the extent to which water quality provides for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allows recreational activities in and on the water. The State of Hawai'i's water quality report does not include Honu'apo Bay or Honu'apo Estuary on the Section 303(d) list (DOH CWB 2024).

Historic materials indicate that several water quality data collection and analysis efforts have been conducted on the estuary. A review of the results finds no anomalies and that quality of the various parameters sampled appears to be 'normal' and within expected concentrations and levels. In general, water quality is not degraded and the daily exchange between the ocean and estuary appears to keep ambient conditions in a condition to support healthy aquatic species. Water quality bacteria levels may be elevated intermittently due to feces from turtles or visiting/resident waterbirds. Turbidity in the estuary appears to be controlled by mixing induced by wind-generated turbulence, and turbidity is likely greatest during late afternoon under trade wind weather patterns (Hawai'i County 2011).

## IMPACTS AND MITIGATION MEASURES

The proposed project would result in the removal of invasive non-native plant species, excavation of approximately 9,475 cubic yards of soil material, and recontouring the topography of the wetland to improve the physical habitat. Additionally, native and endemic plants would be introduced to restore the ecological balance of the wetland. The total area disturbed area would be approximately 5.25 acres. Given that the project is proposing to dredge and deepen some areas of the estuary at Honu'apo, this action constitutes in-water construction and requires a USACE permit under their delegated Clean Water Act authority. The DOFAW has submitted permit application to USACE under the USACE Regulatory Program that administers and enforces Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act.

Construction activities disturbing one or more acres are regulated under the National Discharge Elimination System (NPDES) stormwater program and are required by the State to obtain a NPDES permit. Prior to the initiation of grading, the project applicant will prepare and implement a stormwater pollution prevention plan and BMPs designed to reduce potential impacts to water quality during construction of the project. The BMPs will identify the most effective erosion, sedimentation, and turbidity control measures to reduce the amount of soil and sediment accumulation in the coastal waters as a result of construction activities. The mitigation measures may include, but not be limited to, the onsite use of the Site-Specific Best Management Practices listed in Section 2.2 of this EA regarding sedimentation and erosion in aquatic environments. The BMPs will be developed in accordance with the County of Hawai'i regulatory requirements as part of the permitting process, including the prevailing soil erosion and stormwater quality standards ("Rules Relating to Water Quality"). With implementation of BMPs, the construction of the project would not result in a violation of water quality standards. For a discussion of impacts due to soil erosion and off-site sediment transport, see Section 3.1, *Geology, Topography, and Soils*. For a discussion of impacts due to flooding, see Section 3.3, *Natural Hazards*.

There would be no significant increase in impervious surface area, so the project would not result in a notable increase in stormwater. The proposed project would expand the volume of the existing wetland pond by approximately 9,475 cubic yards, enhancing its overall capacity to manage stormwater. The proposed drainage design would align with existing flow patterns, with the entire project area located within a single basin. Runoff within the drainage basin would continue to either infiltrate and/or flow to the pond. The proposed pond improvements would maintain the integrity of the current drainage system while improving its capacity to manage stormwater. There would be no anticipated increase in discharge of stormwater to Honu'apo Bay over existing conditions (see Appendix D).

The proposed wetland pond improvements would have a beneficial impact on water quality by providing increased wetland pond area that would act as a filter for pollutants and sediments in stormwater from upland areas. The proposed pond improvements would not be expected to cause an increase in sediment discharge from the project site to nearby surface waters. In addition, kiawe trees are tapping into the ground water and extracting fresh and brackish water that would otherwise flow into the estuary and dilute the seawater. Removal of kiawe trees should increase the volume of fresh water flowing into the estuary, which would enhance ecohydrological conditions favorable to native plants and animals (Hawai'i County 2011).

Wetland restoration improvements planned under this project would have a positive beneficial impact on the Honu‘apo estuary by increasing overall wetland pond area. Increased open water areas and intertidal mudflats created would provide better habitat for endangered waterbirds to breed and forage within Honu‘apo estuary, as discussed in Section 3.4, *Biological Resources*.

Site-specific BMPs would be implemented during construction to prevent any wastewater, sediment, soil, and debris resulting from the proposed construction from adversely impacting the coastal ecosystem and State Waters in accordance with HAR Chapter 11-54. Compliance with BMPs for construction would minimize impacts to water quality. No long-term or cumulative adverse effects to hydrology or water quality are anticipated with implementation of the proposed action.

## 3.3 NATURAL HAZARDS AND CLIMATE CHANGE

Natural hazards in the project region include earthquakes, volcanic activity, waves and storms, flooding from hurricanes and tropical storms, and tsunamis. Climate change and the related sea level rise will also impact the Hawaiian Islands.

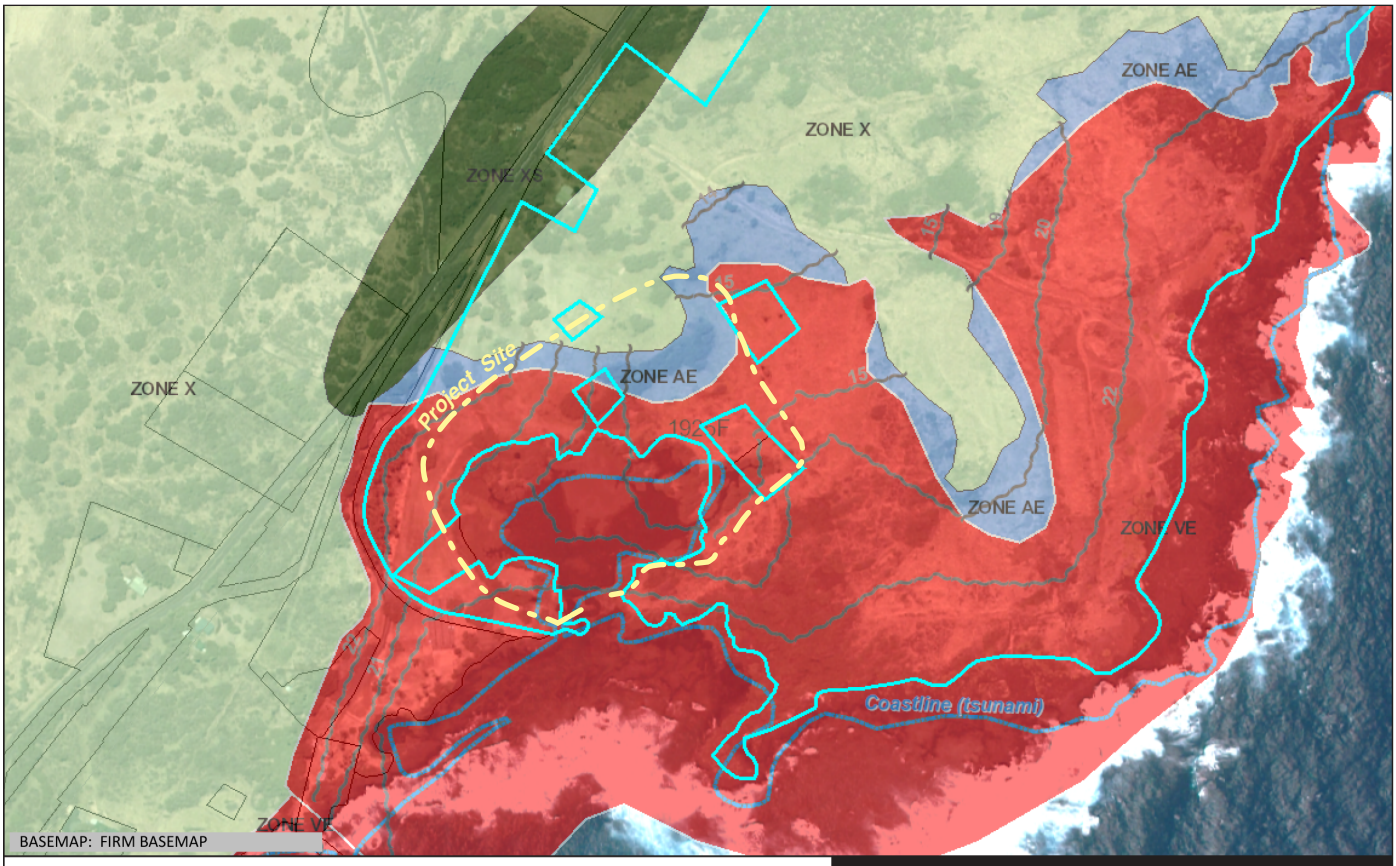
### *Earthquake and Volcanic Hazards*

The seismic hazard and earthquake occurrence rates in Hawai‘i are locally as high as that near the most hazardous faults elsewhere in the United States. Most of the earthquakes in Hawai‘i are directly related to volcanic activity and are caused by magma moving beneath the earth’s surface. Numerous small earthquakes are reported each year, mostly on Hawai‘i Island. According to Federal Emergency Management Agency (FEMA) earthquake hazard maps, the project area is located within Seismic Design Category E, which means it is near major active faults capable of producing the most intense shaking and could result in considerable damage (FEMA 2020). A U.S. Geological Survey study indicates that the Hawaiian Islands, especially the Island of Hawai‘i and neighboring islands with active volcanic activity, are likely to experience damaging ground shaking from an earthquake in the next century (Petersen et. al. 2021). Ground shaking is forecasted to be highest near the active volcanos of Kīlauea and Mauna Loa in the southernmost portion of the Island of Hawai‘i.

The project area is located within the Nā‘ālehu inundation zone of Mauna Loa (Trusdell and Zoeller, 2017). It is categorized as lava-flow hazard Zone 6, which is protected by topography. The zones, ranked from 1 through 9, represent a scale of decreasing hazard as the numbers increase, based on the probability of coverage by lava flows (Wright et. al. 1992).

### *Tsunami and Flood Hazards*

The FEMA maps the project site as predominantly Zone VE, with peripheral areas in floodway areas designated as Zone AE and Zone X (see Figure 8). Zone VE includes coastal flood zone with velocity hazard (wave action). Flood Zone AE as defined for the project area applies to lands within the 100-year flood zone with Base Flood Elevations determined. Base flood elevations at the project site range from 22 feet closest to the shore to 15 feet further inland. Properties in Zone X are determined to be outside the 0.2 percent annual chance floodplain (HNFIP 2017). The project site is located within the tsunami evacuation zone (see Figure 9) (NOAA 2015).




# Flood Hazard Assessment Report

www.hawaiinfip.org

## Property Information

| | |
|---|---|
| COUNTY: | HAWAII |
| TMK NO: | (3) 9-5-014:007 |
| WATERSHED: | HILEA |
| PARCEL ADDRESS: | ADDRESS NOT FOUND<br>PAHALA, HI 96777 |

## Notes:

## Flood Hazard Information

| | |
|---|---|
| FIRM INDEX DATE: | SEPTEMBER 29, 2017 |
| LETTER OF MAP CHANGE(S): | NONE |
| FEMA FIRM PANEL: | 1551661925F |
| PANEL EFFECTIVE DATE: | SEPTEMBER 29, 2017 |

THIS PROPERTY IS WITHIN A TSUNAMI EVACUTION ZONE: YES
FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: NO
FOR MORE INFO, VISIT: http://dlnreng.hawaii.gov/dam/

0 400 800 ft

*Disclaimer: The Hawaii Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use, accuracy, completeness, and timeliness of any information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR, its officers, and employees from any liability which may arise from its use of its data or information.*

*If this map has been identified as 'PRELIMINARY', please note that it is being provided for informational purposes and is not to be used for flood insurance rating. Contact your county floodplain manager for flood zone determinations to be used for compliance with local floodplain management regulations.*

**FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND**
**(***Note: legend does not correspond with NFHL)*

**SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD** - The 1% annual chance flood (100-year), also know as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

| | |
|---|---|
| | **Zone A**: No BFE determined. |
| | **Zone AE**: BFE determined. |
| | **Zone AH**: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined. |
| | **Zone AO**: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. |
| | **Zone V**: Coastal flood zone with velocity hazard (wave action); no BFE determined. |
| | **Zone VE**: Coastal flood zone with velocity hazard (wave action); BFE determined. |
| | **Zone AEF**: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE. |

**NON-SPECIAL FLOOD HAZARD AREA -** An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

| | |
|---|---|
| | **Zone XS (X shaded)**: Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood. |
| | **Zone X**: Areas determined to be outside the 0.2% annual chance floodplain. |

**OTHER FLOOD AREAS**

| | |
|---|---|
| | **Zone D**: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase apply, but coverage is available in participating communities. |

*Honu'apo Estuary Wetland Restoration*

SOURCE: Hawai'i National Flood Insurance Program (HNFIP) 2017

**Figure 8**
Flood Hazard Map

*Honu'apo Estuary Wetland Restoration*

SOURCE: NOAA Office for Coastal Management 2015

**Figure 9**

Tsunami Evacuation Zone

Overland runoff from the hillsides above Honuʻapo historically caused flooding on the project site. An irrigation system of ditches developed and formerly maintained by the sugar plantations of Kaʻū has affected the surface hydrology of the area and, according to verbal accounts, decreased the number of flooding events at Honuʻapo. A ditch from the mill to the shoreline would periodically get clogged by debris and spill out the mill effluence, which would run overland to the estuary, likely causing some filling of the estuary. With the shutting down of the sugar industry in Kaʻū and the subdivision of plantation lands into smaller parcels, the irrigation system is no longer maintained (Hawaiʻi County 2010).

### *Hazardous Materials*

As discussed above in Section 3.1, *Geology, Topography, and Soils*, the soil screening conducted for the project found that no contaminants of concern are present in the project site soils, it is recommended that additional samples be collected and analyzed from soil stockpiles during construction to further verify the results presented in the report to determine the appropriate soil disposal or re-use parameters.

### *Climate Change and Sea Level Rise*

Global Warming is a public health and environmental concern around the world. As global concentrations of atmospheric greenhouse gases increase, global temperatures increase, weather extremes increase, and air pollution concentrations increase. Global warming and climate change have been observed to contribute to poor air quality, rising sea levels, melting glaciers, stronger storms, more intense and longer droughts, more frequent heat waves, increases in the number of wildfires and their intensity, and other threats to human health (IPCC 2022). The year 2024 was the warmest year since global records began in 1850. The 10 warmest years in the 175-year record have all occurred during the last decade (2015–2024) (NOAA 2025).

The influences of climate change on global and local ecosystems are varied and often detrimental. In Hawaiʻi, the rate of warming air temperature has quadrupled in the last 40 years to over 0.3°F (0.17°C) per decade. Higher temperatures are projected to result in native plant and animal stress, an increase in heat-related illnesses and vector-borne diseases such as dengue fever, and a higher concentration of invasive species. Additional impacts are projected to include a decrease in trade winds and overall disruption of rainfall patterns; warmer oceans and higher ocean acidity, which could lead to coral bleaching; and a rise in sea levels. Hawaiʻi's coastal areas will see rapid increases in tidal flooding events beginning in the mid-2030s (University of Hawaiʻi 2014; State of Hawaiʻi 2023).

According to a report by the Hawaiʻi Climate Change Mitigation and Adaptation Commission (2017), sea level rise could result in low-lying coastal areas around the island to become chronically flooded within the mid- to latter-half of this century. This land will become submerged by coastal erosion, direct marine flooding from tides and waves, or become new wetlands behind the shoreline from rising water tables and reduced drainage.

The Hawai'i Sea Level Rise Report and Hawai'i Sea Level Rise Viewer document the modeled potential future exposure of each island to multiple coastal hazards as a result of sea level rise. [11] For the island of Hawai'i, the Sea Level Rise Exposure Area (SLR-XA) is the footprint of passive inundation, one of three flooding hazards with sea level rise, including passive inundation (flooding), coastal erosion, and annual high wave runup (Romine, et. al. 2020). These hazards were modeled for four future sea level rise scenarios, including 0.5 feet, 1.1 feet, 2.0 feet, and 3.2 feet. The 3.2-foot projection of sea level rise is considered an "intermediate" scenario by 2100 and an "extreme" scenario as soon as 2060 (Romine, et. al. 2020). Based on modeling predictions, areas around Honu'apo Bay and the project site would be vulnerable to chronic flooding with 3.2 feet of sea level rise (see Figure 10).

**County of Hawai'i Integrated Climate Action Plan**

The County of Hawai'i published the Integrated Climate Action Plan in June 2023, a comprehensive strategy that outlines the county's commitment to reducing its carbon footprint and ensuring the sustainability of its services and facilities. The goals of the plan are to: (1) Improve county capacity to implement climate action; (2) Reduce the county's contribution to global greenhouse (GHG) emissions; and (3) Increase the resilience of county infrastructure, assets, and services to climate change impacts. The county's plan identifies Hawai'i Island targets of 50 percent below 2005 GHG emission levels by 2030, and 100 percent carbon neutral by 2045. For Hawai'i County, the plan identifies targets of 100 percent renewable energy-powered County fleet by 2035, and 100 percent renewable energy-powered county facilities by 2040.

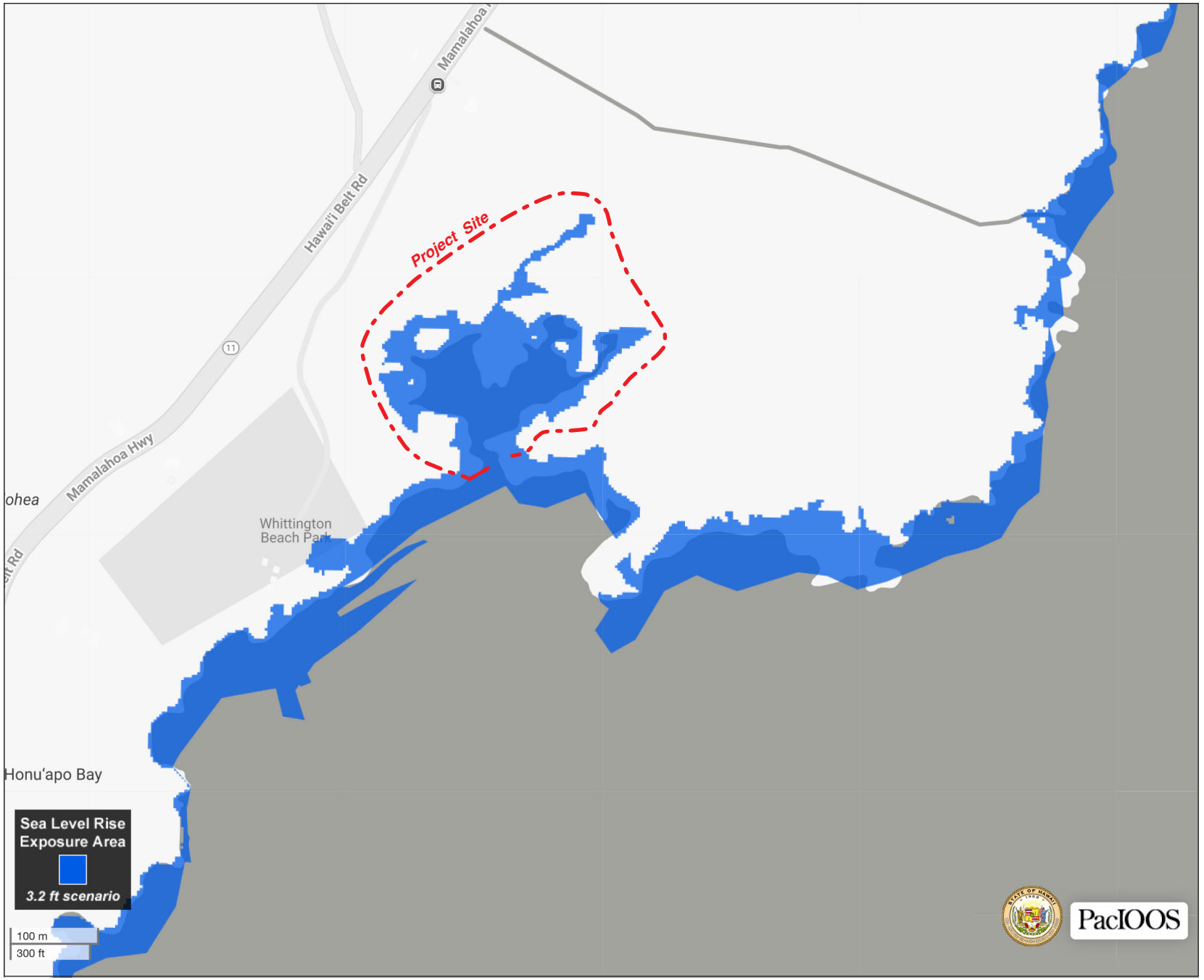
## IMPACTS AND MITIGATION MEASURES

### *Natural Hazards*

Establishment of the wetland pond would not result in increased flooding or hazards from flooding in surrounding areas. Storm runoff upland of the project site would either infiltrate and/or flow to the pond, maintaining the integrity of the current drainage system while improving its capacity to manage stormwater. Based on existing drainage and proposed drainage impacts, the proposed wetland restoration would not result in increased flooding that could adversely affect the project area (see Appendix D). For a discussion of stormwater erosion and sedimentation, see Section 3.2, *Hydrology and Water Quality*.

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high risk areas). State projects are required to comply with 44CFR regulations as stipulated in Section 60.12. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards. The proposed improvements would be designed and constructed in conformance with the standards and requirements of the Hawai'i County Code, Chapter 27, *Floodplain Management*. In accordance with Section 27-23(1), all new construction in a coastal high hazard area must be constructed with materials and utility equipment resistant to flood damage and using methods and practices that minimize flood damage. The proposed improvements would be reviewed for consistency with the requirements of the Hawai'i County Code prior to approval.

[11] All sea level rise results from the hazard modeling and vulnerability assessment can be viewed on the Hawai'i Sea Level Rise Viewer (http://hawaiisealevelriseviewer.org/).




*Honu'apo Estuary Wetland Restoration*

SOURCE: Tetra Tech, Inc. and Sobis, Inc. 2017

**Figure 10**

Sea Level Rise Exposure Area (SLR-XA) 3.2 Feet Scenario

Prior to the initiation of construction, the County would review proposed grading and construction plans for consistency with county requirements and good engineering practice, which would minimize damage during tropical storm, hurricane, or strong wind events, and earthquake events. No significant environmental effects would result, and no mitigation would be necessary. No significant long-term or cumulative adverse environmental effects would result from natural hazards, and no mitigation would be necessary.

### *Climate Change and Sea Level Rise*

Greenhouse gas emissions would be generated from the proposed wetland restoration project during construction and some maintenance activities. Temporary greenhouse gas emissions would occur during construction activities and during removal of stockpile materials, predominantly from vehicle and equipment exhaust. No regular operational greenhouse gas emissions are anticipated – limited emissions could occur from maintenance/work vehicles accessing the site and from visitors to the wetland. Greenhouse gas emissions would not be expected to be significant, and the project would not be expected to make a substantial contribution to the cumulatively significant impact of global warming and climate change.

The project site is located along the shoreline. Based on modeling predictions, areas of the Honu'apo Estuary Wetland project site would be permanently flooded with 3.2 feet of sea level rise (see Figure 10) (Hawai'i Climate Change 2021). However, the modeling does not consider the expanded volume of the existing wetland pond as a result of the project, enhancing its capacity to accommodate flooding. The wetland restoration project was designed to account for gradual and long-term increase in sea levels; the current protected status of the wetland and undeveloped open land surrounding the inland side of the wetland allows for future wetland migration as climatic changes resulting in sea level rise. New and expanded wetland areas may form, potentially improving wildlife habitat (Hawai'i Climate Change 2017). Lateral access along the shoreline is already constrained at the mouth of the estuary, and while it may prove more difficult with 3.2 feet of sea level rise, the proposed wetland restoration may minimize these effects. The 2017 report on sea level rise adaptation encourages the preservation and restoration of natural landscape features, such as streams, floodplains, and wetlands based on their inherent capacity to minimize the impacts of climate change. Therefore, the proposed wetland restoration project would have a beneficial effect on climate change (Hawai'i Climate Change 2017).

To minimize potential damage to the wetland restoration improvements during flooding, the pond improvements would be designed and constructed in conformance with applicable design standards. No significant long-term or cumulative adverse environmental effects would result from natural hazards, and no mitigation would be necessary.

## 3.4 BIOLOGICAL RESOURCES

The evaluation of biological resources set forth in this EA is summarized from the Biological Resources Update for Honu'apo Estuary, completed in July 2022 (see Appendix E). The survey updated information on ecological features of the project site set forth in the 2011 Restoration Plan (Hawai'i County 2011). Information from more recent surveys and observations of the wetland was included in the update (see Appendix E). For the following summary discussion, common names are used for plant and wildlife species, except for special status species for which both common and

scientific names are set forth. Scientific names for other species cited are set forth in the report noted above.

During the consultation and permitting process, the USFWS provided comments based on the 2022 Biological Resources Update for Honu'apo Estuary Final Report (see Appendix E), project engineering drawings (see Appendix B), and the IPaC Species list for Honu'apo Estuary Wetland Restoration Phase 1 project (dated 2/24/2025) as it pertains to listed species and designated critical habitat in accordance with Section 7 of the Endangered Species Act (ESA). Information in the USFWS letter, including recommended minimization measures, are set forth in this EA.

Under HRS Chapter 195D, the State, along with the federal government, provides for the conservation, protection, and propagation of unique and indigenous threatened and endangered species of Hawai'i. Often referred to as the Hawaii Endangered Species Act, this law is specifically designed to protect aquatic life, wildlife, and land plants. HAR Chapter 13-124 is a set of administrative rules created by the DLNR to implement and enforce Hawai'i's state wildlife protection laws, including HRS Chapter 195D. These rules list endangered and threatened species within the state, and includes species beyond those listed under the Federal ESA.[12] These species as applicable to the project are set forth below.

### *Existing Habitat*

The project site consists of ±8-acres of estuary and marsh habitat located along the Ka'ū coast. The influx of fresh water from springs and seeps (punawai) dilutes salt water and creates a brackish water environment in the Honu'apo estuary. Years of neglect and misuse have resulted in altered hydrology, sedimentation, and invasion by non-native plants and animals. This has contributed to impairment of wetland functions and decreased habitat for native resident and migratory birds and other native animals. For example, springs along the inland margin of the estuary are encroached on by invasive California grass and kiawe, resulting in decreased habitat and adverse impacts to the system's hydrology.

Numerous research projects and plans have included biological inventories of plants and animals in Honu'apo park lands. In the past, the DOFAW has conducted semi-annual avian surveys. Bird watchers and other visitors to the area have observed birds using Whittington Beach Park and the estuary. Based on these observations, the estuary is used by both migratory and native birds, and their presence indicates that the estuary is along flight paths and is used even in its degraded condition. According to resource managers and those with knowledge of the area, predators are the main cause of the restricted bird use at Honu'apo estuary (Hawai'i County 2011).

Predators can impact native waterbird populations directly and indirectly. In addition, they may carry diseases that can be transmitted to humans, monk seals, and other species. Feral cat colonies impact endangered and migratory bird health mainly through predation, competition, and transmission of disease. The main disease of concern is toxoplasmosis, which is caused by the parasite *Toxoplasma gondii*. Toxoplasmosis is carried by cats and is passed in their feces. The most dangerous form of the bacteria is the oocysts, the egg encapsulated form, which is not killed when exposed to air or water (fresh or salt). Eggs can be transmitted by exposure to cat feces in the soil, exposure to water carrying the eggs, and ingestion of infected animals. Toxoplasmosis can spread to humans and other

[12] https://dlnr.hawaii.gov/dofaw/files/2013/09/Chap124a-Ex.pdf

animals and has been linked to deaths of Hawaiian monk seals, spinner dolphins, and several species of birds. If toxoplasmosis does not kill animals outright, it can leave them in a weakened state that makes them more vulnerable to predation and other diseases. Although the cats at Honuʻapo are part of a managed trap/ neuter/ release / feed cat colony, the regular feeding of feral cats usually results in attracting more cats to the area as well as enhancing the populations of mongooses and rats. Like cats, mongoose and rats will eat eggs, chicks, and adults of some avian species. In addition, cats and mongoose host fleas, which can also pose a disease risk, especially to humans (Hawaiʻi County 2011).

### *Vegetation*

There are three primary vegetation zones within the project area: wetland, coastal strand, and upland. Wetland vegetation includes emergent plants like reeds, sedges, grasses, and some trees; coastal strand plants are more low-lying and salt-tolerant, and mostly found between makai (ocean side) of the estuary and along the coastline; and the upland plant community includes grasses, shrubs, bushes and trees and is found mauka (mountain side) of the wetland (see Appendix E).

**Wetland Plant Community**
The dominant overstory plant species in the wetlands of Honuʻapo estuary are milo, a tree likely introduced by Polynesians, and the invasive tree, kiawe (mesquite). Grasses dominate the understory. These include the dominant native grass ʻakiʻaki and invasive seashore paspalum. Other prevalent non-native and invasive grass species within the wetland region include California grass and manienie (Bermuda grass), but these tend to be limited to areas above the higher high tide area. Within the wetland area, the native ʻākulikuli (sea purslane) is common, and in the intertidal and palustrine zones near the freshwater seeps and springs at the mauka side of the estuary, the native nānaku (giant bulrush) is thriving in large, clumping patches. Additionally, in these shallow backwater areas, there is now at least one type of marine limu (seaweed) species present, likely a *Cladophora* sp. that may have been introduced on the tabies / shoes of shoreline users or fishermen that also frequent other wetland habitats in Hawaiʻi. While this species is native and not invasive, per se, it can degrade the habitat for other native species.

**Upland Plant Community**
The uplands directly adjacent to the wetland area are dominated by non-native invasive species including: haole koa, Guinea grass, beach heliotrope, and kiawe, along with other dry shrubland species such as Christmas berry, java plum, and sourbush.

**Coastal Strand Plant Community**
The coastal strand vegetation community is located between the shoreline and estuary and is dominated by native plants adapted to an environment of sea spray including: naupaka kahakai, ʻakulikuli or sea purslane, and mauʻu ʻakiʻaki. It is likely that the coastal strand community was once more diverse and included other species commonly found along the Kaʻū coastline.

### *Fish and Wildlife*

Honuʻapo Estuary is habitat for a diversity of native and endemic fish and wildlife. Species lists are found in Appendix E.

**Terrestrial Mammals**
Terrestrial mammals found in the park area include introduced wild and feral species, including feral cats, pigs, goats, mongoose, mice, and rats. There is at least one feral cat colony that is actively maintained by local residents. This area is also used frequently by local residents with dogs, though dogs are generally on leash and in control of the owner. Anecdotal evidence indicates that the federally listed endangered ʻōpeʻapeʻa, or Hawaiian hoary bat, may forage and roost in the vicinity of Honuʻapo.

**Birds**
There are three native endemic waterbirds that are listed under the Endangered Species Act (ESA) that may be found at Honuʻapo estuary: aeʻo (Hawaiian stilts*)*, ʻalae keʻokeʻo (Hawaiian coot), and kōloa moali (Hawaiian duck). Several migratory waterbirds, protected under the Migratory Bird Treaty Act (MBTA) and North American Wetland Conservation Act (NAWCA), may utilize either the land or marine environments near the estuary. These include hunakai (sanderling), kioea (bristle-thighed curlew) and ʻulili (wandering tattler). Kioea and ʻulili are designated by USFWS as Birds of Conservation Concern (BCC, USFWS 2021). Other non-wetland species included in the 2021 BCC update that may be found at Honuʻapo include the pueo (Hawaiian short-eared owl), the iʻo (Hawaiian hawk), the iwa (great frigatebird), the noio (Black Noddy) (USFWS 2021). Additionally, DOFAW biologists conducted 46 semi-annual surveys at Honuʻapo over the 33-year period between 1986 and 2019 and have confirmed observations of ʻakekeke (ruddy turnstone), kōlea (Pacific golden plover), an aeʻo, and nine other bird species (see Appendix E). The density and high stature vegetation present in most of the intertidal wetland type at Honuʻapo reduces its use by wading birds, since they are not able to walk over the vegetation or access the ground surface to reach food sources (Hawaiʻi County 2011).

KOOH volunteers have also routinely observed ʻulili utilizing the estuary and rocky shoreline, along with occasional threatened nēnē birds (Hawaiian goose) and the resident native ʻaukuʻu (black-crowned night heron) frequently noted around the estuary. The aeʻo are also frequently noted, as there are two that live at Honuʻapo and go to Pāhala to nest, then return every year. The seabird noio or black noddy is also commonly seen in flocks flying in and out of refuges in the rocky coastal cliffs of the area to the south of the wharf. Koaʻe kea (white-tailed tropic bird) and ʻio have also been observed at Honuʻapo. Non-native birds found at Honuʻapo include the northern cardinal, Japanese white-eye, spotted dove, zebra dove, the common barn owl, egrets, and the occasional domestic duck. It was also noted that a Harlequin Duck wintered at Honuʻapo in 2023. There are no native forest birds found near the wetland or that are known to travel through the surrounding areas.

**Aquatic Species**
The estuary provides important spawning and nursery habitat for a large number of native fishes. A reef area located at the mouth of the estuary is naturally protected by a breakwall of pāhoehoe lava and provides prime habitat for juvenile fishes and other marine life. Local residents recall that the estuary used to provide good habitat for pāpio (juvenile trevally, ulua). Native fish species that have been recorded in Honuʻapo estuary include the endemic āholehole (Hawaiian flagtail), ʻamaʻama (striped mullet), halfspot goby, Hawaiian shrimp goby, the threatened ʻōʻopu naniha goby, ohua (juvenile manini, convict tang), the endemic ʻōʻopu akupa, wekeʻa (yellowstripe goatfish) and wekeʻula (yellowfin goatfish). Invasive fishes include livebearers (mosquitofish and guppies) and introduced kanda mullet and may also include small amounts of tilapia and introduced snappers.

Recorded crustaceans include snapping shrimp, ʻōpae huna (feeble shrimp) and aʻama (thin-shelled rock crab). Native mollusks include nahawale liʻi liʻi (Hawaiian mussel). The threatened honu (green sea turtle) is also known to frequent Honuʻapo Estuary and the name of the area has been translated to both "turtle poking its head above the water" or "caught turtle". In addition, the critically endangered honuʻea (hawksbill sea turtle) has been recorded in Honuʻapo Bay, and nearby nesting sites include Kamehame, Punaluʻu, Nīnole, and Kāwā. The endangered ʻilio holo i ka uaua or nā mea hulu (Hawaiian monk seal) is also occasionally observed using the bay and the beach near the estuary, and was most recently noted in December 2023.

**Insects**

The endangered, endemic orange-black Hawaiian damselfly (pinapinao) has been seen at Honuʻapo Estuary near freshwater seeps. Other insects include a wide variety of introduced dragonflies, and both native and non-native moths, beetles, and bees. Nearby coastal regions have also confirmed the presence of another endangered and endemic insect, nalo meli maoli (Hawaiian yellow-faced bee), so it is likely that this species is also an inhabitant of Honuʻapo and using some of the resident flora for nectar and driftwood to bore holes for their homes.

## IMPACTS AND MITIGATION MEASURES

The proposed wetland restoration project is designed to bring Honuʻapo Estuary back into balance by removing invasive plants and animals and improving physical habitat structure and its associated ecological components for desired native species (see Figure 4 for the Vegetation Removal Plan and Figure 5 for the Re-Vegetation Plan). In general, dense ground cover with non-native grasses provides cover for predators and is an obstacle to birds walking and foraging. While predator control should reduce direct predation on resident and migratory bird species, the USFWS expressed concern that predators could circumvent the fence at the mouth of the estuary and enter the wetland. Further, the predator fence may be a hazard to animals, ʻōpeʻapeʻa, Hawaiian waterbirds, and Hawaiian seabirds that may collide with the fence. Project plans are being updated to construct the fence up to the water's edge and into the water so predators cannot get around it. Mitigation measures identified below would further minimize impacts from the fence to the extent feasible.

Recreational activities at Honuʻapo could result in a negative impact on the wetland area if not properly managed. The proposed walkway and pedestrian access would limit these activities to designated areas that would minimize disturbance to avian species using the site. Educational displays and managed educational or volunteer programs would also help to ensure that public use of the area does not compromise the restored habitat.

The proposed improvements and continued maintenance would promote native species, control or eliminate invasive species, and increase wetland function. However, the proposed project improvements and maintenance work around or in the pond could affect endangered waterbirds, their eggs, or habitat. The Honuʻapo Estuary Wetland Restoration project may affect, but is not likely to adversely affect the following federally and/or state listed species:[13]

[13] These species were identified by the USFWS IpaC species list for the project area, or identifed by DLNR biologists as a species listed under HAR Chapter 13-124. Not all species listed are necessarily present at the project site, but have the potential to occur.

**Animals:**

- ʻōpeʻapeʻa (Hawaiian hoary bat, *Lasiurus cinereus semotus*)
- nēnē (Hawaiian goose, *Branta sandvicensis*)
- Hawaiian waterbirds, including aeʻo (Hawaiian stilt, *Himantopus mexicanus knudseni*), ʻalae keʻokeʻo (Hawaiian coot, *Fulica alai*), and koloa maoli (Hawaiian duck, *Anas wyvilliana*)
- Hawaiian seabirds including ʻuaʻu (Hawaiian petrel, *Pterodroma sandwichensis*), ʻaʻo (Newell's shearwater, *Puffinus newelli*), short-tailed albatross (*Phoebastria albatrus*), and ʻakēʻakē (band-rumped storm petrel, *Oceanodroma castro*) (listed under HAR Chapter 13-124)
- ʻio (Hawaiian hawk, *Buteo solitarius*)(listed under HAR Chapter 13-124)

**Insects:**

- orangeblack Hawaiian damselfly (pinapinao, *Megalagrion xanthomelas*)
- Blackburn's sphinx moth (*Manduca blackburni*)

**Reptiles:**

- sea turtles, including honu (green sea turtle, *Chelonia mydas*) and honu ʻea (hawksbill sea turtle, *Eretmochelys imbricata)*

**Plants:**

- Carter's panic grass (*Panicum fauriei* var. *carteri*)
- ʻihi (*Portulaca villosa*)
- *Vigna o-wahuensis*
- loulu (*Pritchardia maideniana*)
- ʻōhai (*Sesbania tomentosa*)
- *Microlepia strigosa* var. *mauiensis*

In general, USFWS is supportive of wetland restoration efforts, but emphasizes that planned maintenance activities are conducted and scheduled so that it has minimal impact on endangered and native species. During the early consultation process, DLNR, Division of Aquatic Resources stated that DAR anticipates a measurable improvement in estuarine habitat conditions from the proposed project, and over time, expects increases in relative abundance and composition of native estuarine species as a result. This aligns with one of DAR's goals to improve and restore aquatic habitats and ecosystems to naturally thriving conditions (see Appendix A). As bird populations increase at Honuʻapo, planned maintenance activities must be conducted and scheduled so that it has minimal impact on endangered and native species. The following Best Management Practices shall be implemented during project activities to minimize impacts to endangered and native species:

- Prior to any work inside the estuary, all equipment, protective gear and shoes (e.g., felt tabies) should be decontaminated and checked for any dirt, mud or seeds to limit the spread of any new potential invasive species. Recommendations include rinsing all heavy equipment and smaller hand tools with a high-pressure hose or washer before and after field activities, and drying all equipment and supplies before bringing them to the restoration site. In addition, tabies that have previously been used at any other location should be cleaned and rinsed in a 10 percent diluted bleach solution, and thoroughly dried prior to using them at Honuʻapo. It would also be best to transit within Honuʻapo lands with other shoes (and not tabies) as there are plenty of weed seeds of different varieties in other sections of the property, and don tabies only when at the estuary.

- Volunteers, contractors and staff working in the area will be asked to refrain from using any chemical-based sunscreen or personal care products on skin surfaces that may be exposed to mudflats or estuarine waters. Likewise, all gloves will be cleaned and dried or new prior to use in the wetland. Volunteers will be briefed on these requests prior to conducting any restoration activities.
- To mitigate any potential negative impacts to wildlife, a 15 - 30 minute survey shall be conducted at the proposed restoration area and within the surrounding 500 feet radius prior to beginning work to ensure that no ESA species are present (e.g., pinao at seeps / freshwater springs, honu swimming or basking in / around the estuary, monk seals swimming in / hauled out around the estuary, or protected bird species, including nēnē, ʻūlili, aeʻo or kioea, utilizing the area where restoration is planned for the day). If a protected species is present, restoration activities will be shifted to another area or activities will be delayed until the native species departs. All restoration work will be conducted during daylight hours and no additional lighting tools will be used (to prevent any disorientation by wildlife) after sunset or before sunrise. If biological surveys are conducted prior to dawn or after dusk, only red-light headlamps will be used.
- During construction, site-specific BMPs developed as part of the permitting process would minimize erosion and sedimentation and potential adverse effects to aquatic biota in the vicinity of the project site.
- The native nalo meli maoli or Hawaiian yellow-faced bees are adapted to a wide array of habitat types, one of which is coastal strand. They tend to nest in hollow stems, holes in trees, under tree bark or in crevices, or in burrows in the soil (https://dlnr.hawaii.gov/ecosystems/hip/species/nalo-meli-maoli/). As an extra precaution, all volunteers, staff, or residents using the shoreline shall be advised not to collect any driftwood or disturb native vegetation along the shoreline (where native yellow-faced bees may reside).

In their consultation comment letter, the USFWS provided the following information and recommended mitigation measures to minimize impacts to these federally listed species:

**Listed Plants**
USFWS records indicate the project's location occurs within the range of the following federally listed plants: Carter's panic grass, ihi, *Vigna o-wahuensis*, loulu, ʻohai, and *Microlepia strigose* var. *mauiensis*. Since surveys were completed within the project area, the USFWS recommends minimizing disturbance outside of existing developed or otherwise modified areas.

To avoid and minimize impacts to listed plant species, the USFWS recommended measure is included as mitigation:

- If work occurs outside these previously surveyed areas, we recommend conducting a survey for listed plants before starting work.

**Orangeblack Hawaiian damselfly – Endangered pinapinao**
Based on comments provided by USFWS during the consultation and permitting process, a site assessment survey was completed to determine whether the orangeblack Hawaiian damselfly is present at the Honuʻapo estuary (Olaʻa Environmental Services 2025). Visual surveys were conducted over three separate days in August 2025 during high and low tides, which allowed for variation in salinity and resident species activity. While the presence of pinapinao was documented at

the project site during a survey in June 1994, orangeblack Hawaiian damselfly adults, naiads, or eggs were not observed at the Honu'apo Estuary Wetland or at the adjacent Whittington Beach Park during the 2025 survey. Given the absence of the orangeblack Hawaiian damselfly during the 2025 survey, it appears that at some point between 1994 and 2025 pinapinao may have been extirpated from the Honu'apo estuary,[14] likely due to the cumulation of threats from invasive guppies and other non-native predators, and possibly water chemistry (Ola'a Environmental Services 2025).

Even though the orangeblack Hawaiian damselfly was not present during the 2025 survey, populations have been recently recorded within five miles of the project site (Ola'a Environmental Services 2025). The proposed estuary restoration project would improve habitat and ecosystem function for native species, including the orangeblack Hawaiian damselfly. The assessment report included additional recommendations that would benefit the pinapinao:

- Consult with the State of Hawai'i's Aquatic Invasive Species program on methods to remove non-native fish from the estuary. Restoration efforts focused on the management of invasive species, including control or eradication of predatory fish species, would improve the habitat and survivorship for the orangeblack Hawaiian damselfly.
- Conduct frequent monitoring of salinity levels throughout the estuary. Collecting baseline data on salinity in multiple areas throughout the estuary will determine whether specific areas of the estuary are within the orangeblack Hawaiian damselfly salinity tolerance threshold (2-15 parts per thousand).
- Conduct monitoring for invasive guppies (*Poecilia* spp.) at least 3 times a year. Monitoring invasive species guides management activities and will help to determine whether the estuary habitat is conducive to naiad survival.
- In collaboration with the Hawai'i Invertebrate Program and the Megalagrion Working Group, evaluate whether the re-introduction of orangeblack Hawaiian damselfly to Honu'apo Estuary would be feasible and suitable to help achieve species recovery (USFWS 2022). Similar orangeblack Hawaiian damselfly introduction efforts are currently underway on Lāna'i (USFWS 2025a).
- Clean and inspect all vehicles, equipment, and earth moving supplies or materials that will be used for restoration activities to reduce the impacts and spread of invasive plants and insects.
- Implement the following minimization and avoidance measures regarding the removal of vegetation, derived from the USFWS (2025) Conservation Agreement for the introduction of orangeblack Hawaiian damselfly to Lāna'i:

    - Plant material removed from at or below the waterline of the pond(s) will be placed in a small containment reservoir on site for thirty (30) days to allow for any eggs present within the plant material to hatch before permanent disposal of the material. Any vegetation or plant parts more than four (4) inches above the water line may be directly disposed of (safe to assume they do not contain eggs or naiads). While vegetation is being held, the containment reservoir will be covered with mesh to prevent Damselfly from laying additional eggs in it. After thirty (30) days, the vegetation and the cover will be removed to allow developing Damselfly to emerge,

[14] An extirpated plant or animal species means that it is now absent from an area that it had once occupied.

and remaining water will be returned to the pond.
- Aquatic vegetation removed from ponds will be placed in a small containment reservoir on site for thirty (30) days to allow for any eggs present within the plant material to hatch before permanent disposal of the material. While vegetation is being held, the containment reservoir will be covered with mesh to prevent Damselfly from laying additional eggs in it. After thirty (30) days, the vegetation and the cover will be removed to allow developing Damselfly to emerge, and remaining water will be returned to the pond.
- Before pond maintenance activities, survey of a fifty (50) foot buffer of the work to ensure avoidance and minimization of impact to Covered Species.

**Hawaiian hoary bat - Endangered ʻōpeʻapeʻa**

The Hawaiian hoary bat roosts in both exotic and native woody vegetation across all islands and will leave young unattended in trees and shrubs when the adults forage. If trees or shrubs 15 feet or taller are cleared during the pupping season, there is a risk that young bats could inadvertently be harmed or killed since they are too young to fly or may not move away. Hawaiian hoary bats forage for insects from as low as 3 feet to higher than 500 feet above the ground and can become entangled in barbed wire used for fencing.

To avoid and minimize impacts to the endangered Hawaiian hoary bat, the USFWS recommended measure is included as mitigation:

- Woody plants greater than 15 feet tall shall not be disturbed, removed, or trimmed during the bat birthing and pup rearing season (June 1 through September 15).
- Barbed wire shall not be used for fencing.

**Threatened nēnē, Hawaiian goose**

*Nēnē* are found on the islands of Hawaiʻi, Maui, Molokaʻi, and Kauaʻi. They are observed in a variety of habitats, but prefer open areas, such as pastures, golf courses, wetlands, natural grasslands and shrublands, and lava flows. Threats to the species include introduced mammalian and avian predators, wind facilities, and vehicle strikes.

To avoid and minimize impacts to nēnē, the USFWS recommended measures are included as mitigation:

- Do not approach, feed, or otherwise disturb nēnē.
- If nēnē are observed loafing or foraging within the project area during the Hawaiian goose breeding season (September through April), a biologist familiar with the nesting behavior of the nēnē shall survey for nests in and around the project area prior to the resumption of any work. Surveys shall be repeated after any subsequent delay of work of three or more days (during which the birds may attempt to nest).
    - Work shall cease immediately, and USFWS shall be contacted for further guidance if a nest is discovered within a radius of 150 feet of proposed work, or a previously undiscovered nest is found within said radius after work begins.

- In areas where nēnē are known to be present, reduced speed limits shall be posted and implemented, and project personnel and contractors shall be informed about the presence of endangered species on-site.

A 4(d) rule was established at the time the nēnē was downlisted to threatened status. Under the 4(d) rule, the following actions are not prohibited under the Act, provided the additional measures described in the downlisting rule are adhered to:

- Take by landowners, or their agents, conducting intentional harassment in the form of hazing or other deterrent measures not likely to cause direct injury or mortality, or nēnē surveys.
- Take that is incidental to conducting lawful control of introduced predators or habitat management activities for nēnē.
- Take by authorized law enforcement officers for the purpose of aiding or euthanizing sick, injured, or orphaned nēnē; disposing of dead specimens; and salvaging a dead specimen that may be used for scientific study.

However, nēnē are still listed as endangered under state law HAR Chapter 13-124, so these authorizations without a state permit would not apply.

**Hawaiian waterbirds: ae‘o, (Hawaiian stilt), ‘alae ke‘oke‘o (Hawaiian coot), and koloa maoli (Hawaiian duck)**

Hawaiian waterbirds are currently found in a variety of wetland habitats including freshwater marshes and ponds, coastal estuaries and ponds, artificial reservoirs, kalo or taro lo‘i or patches, irrigation ditches, sewage treatment ponds, and in the case of the Hawaiian duck, montane streams and marshlands. Hawaiian stilts may also be found wherever ephemeral or persistent standing water may occur. Threats to these species include nonnative predators, habitat loss, and habitat degradation. Hawaiian ducks are also subject to threats from hybridization with introduced mallards.

The proposed project may result in the creation of additional areas of standing water or open water that could attract Hawaiian waterbirds to the project site. In particular, the Hawaiian stilt is known to nest in sub-optimal locations (e.g., any ponding water), if water is present. Hawaiian waterbirds attracted to sub-optimal habitat may suffer adverse impacts, such as predation and reduced reproductive success, and thus the project may create an attractive nuisance. The proposed project includes additional features that would avoid impacts to listed species (e.g., fencing, vegetation control, predator management). Consultation with USFWS will continue during the permitting process to ensure project measures avoid impacts to listed species. Furthermore, KOOH plans to work with Birds of Hawai‘i Past Present to identify any ae‘o nests in the project area and avoid these sites as needed. Silt, sediment, or vegetation removal would not be conducted around any known ae‘o nest.

To avoid and minimize potential project impacts to Hawaiian waterbirds, the USFWS recommended measures are included as mitigation:

- In areas where waterbirds are known to be present, post and implement reduced speed limits, and inform project personnel and contractors about the presence of endangered species on-site.

- If water resources are located within or adjacent to the project site, incorporate applicable best management practices regarding work in aquatic environments into the project design.
- Have a biological monitor that is familiar with the species' biology conduct Hawaiian waterbird nest surveys where appropriate habitat occurs within the vicinity of the proposed project site prior to project initiation. Repeat surveys again within three days of project initiation and after any subsequent delay of work of three or more days (during which the birds may attempt to nest). If a nest or active brood is found:
    - Contact the Service within 48 hours for further guidance.
    - Establish and maintain a 100-foot buffer around all active nests and/or broods until the chicks/ducklings have fledged. Do not conduct potentially disruptive activities or habitat alteration within this buffer.
    - Have a biological monitor that is familiar with the species' biology present on the project site during all construction or earth moving activities until the chicks/ducklings fledge to ensure that Hawaiian waterbirds and nests are not adversely impacted.

**Hawaiian seabirds: Endangered ʻuaʻu (Hawaiian petrel), Threatened ʻaʻo, (Newell's shearwater), and Endangered Hawaiʻi Distinct Population Segment of the ʻakēʻakē (band-rumped storm-petrel):**
Hawaiian seabirds may traverse the project area at night during the breeding, nesting and fledging seasons (March 1 to December 15). Outdoor lighting could result in seabird disorientation, fallout, and injury or mortality. Seabirds are attracted to lights and after circling the lights they may become exhausted and collide with nearby wires, buildings, or other structures or they may land on the ground. Downed seabirds are subject to increased mortality due to collision with automobiles, starvation, and predation by dogs, cats, and other predators. Young birds (fledglings) traversing the project area between September 15 and December 15, in their first flights from their mountain nests to the sea, are particularly vulnerable to light attraction.

To avoid and minimize potential project impacts to seabirds, the USFWS recommended measures are included as mitigation:

- Fully shield all outdoor lights so the bulb can only be seen from below.
- Install automatic motion sensor switches and controls on all outdoor lights or turn off lights when human activity is not occurring in the lighted area.
- Avoid nighttime construction during the seabird fledging period, September 15 through December 15.

Seabirds have been known to collide with fences, powerlines, and other structures near nesting colonies. To avoid and minimize the likelihood of collision, USFWS recommends the following measure as mitigation:

- Where fences extend above vegetation, integrate three strands of polytape into the fence to increase visibility.
- For powerlines, guy-wires and other cables, minimize exposure above vegetation height and vertical profile.

**Endangered Blackburn's sphinx moth:**
The adult Blackburn's sphinx moth feeds on nectar from native plants, including beach morning glory, ʻilieʻe, maiapilo, and others. Blackburn's sphinx moth larvae feed on non-native tree tobacco and native ʻaiea. To pupate, the larvae burrow into the soil and can remain in a state of torpor for a year or more before emerging from the soil. Soil disturbance can result in death of the pupae.

The USFWS recommends surveys to assess whether the Blackburn's sphinx moth occurs within the project area:

- A biologist familiar with the species should survey areas of proposed activities for Blackburn's sphinx moth and its larval host plants prior to work initiation.
    - Surveys should be conducted during the wettest portion of the year (usually November-April or several weeks after a significant rain) and within 4-6 weeks prior to construction.
    - Surveys should include searches for adults, eggs, larvae, and signs of larval feeding (chewed stems, frass, or leaf damage).
    - If moths, eggs, larvae, or native ʻaiea or tree tobacco over 3 feet tall, are found during the survey, please contact the Service for additional guidance to avoid impacts to this species.

If no Blackburn's sphinx moth, ʻaiea, or tree tobacco are found during surveys, measures shall be taken to avoid attraction of Blackburn's sphinx moth to the project location and prohibit tree tobacco from entering the site. Tree tobacco can grow greater than 3 feet tall in approximately 6 weeks. If it grows over 3 feet, the plants may become a host plant for Blackburn's sphinx moth. The USFWS recommends the following:

- Remove any tree tobacco less than 3 feet tall.
- Monitor the site every 4-6 weeks for new tree tobacco growth before, during, and after the proposed ground-disturbing activity.
    - Monitoring for tree tobacco can be completed by any staff, such as groundskeeper or regular maintenance crew, provided with picture placards of tree tobacco at different life stages.

**Threatened (Central North Pacific DPS) (Hawai'i and Johnston Atoll) Green sea turtles (*Chelonia mydas*) and Endangered Hawksbill sea turtle (*Eretmochelys imbricata*) (collectively referred to as sea turtles):**
The USFWS consults on sea turtles and their use of terrestrial habitats (beaches where nesting and/or basking is known to occur), whereas the NOAA Fisheries consults on sea turtles in aquatic habitats. USFWS recommends consultation with NOAA Fisheries regarding the potential impacts from the proposed project if it may affect offshore or open ocean habitats.

Green sea turtles may nest on any sandy beach area in the Pacific Islands. Hawksbill sea turtles exhibit a wide tolerance for nesting substrate (ranging from sandy beach to crushed coral) with nests typically placed under vegetation. Both species exhibit strong nesting site fidelity. Nesting occurs on beaches from May through September, peaking in June and July, with hatchlings emerging through November and December.

Construction on, or in the vicinity of, beaches can result in sand and sediment compaction, sea turtle nest destruction, beach erosion, contaminant and nutrient runoff, and an increase in direct and ambient light pollution which may disorient hatchlings or deter nesting females. Off-road vehicle traffic may result in direct impacts to sea turtles or nests and also contributes to habitat degradation through erosion and compaction.

To avoid and minimize project impacts to sea turtles and their nests, the USFWS recommended measures are included as mitigation:

- No vehicle use on or modification of the beach/dune environment during the sea turtle nesting or hatching season (May to December).
- Do not remove native dune vegetation.
- Incorporate applicable best management practices regarding Work in Aquatic Environments (see BMPs) into the project design. Have a biologist familiar with sea turtles conduct a visual survey of the project site to ensure no basking sea turtles are present.

    - If a basking sea turtle is found within the project area, cease all mechanical or construction activities within 100 feet until the animal voluntarily leaves the area.
    - Cease all activities between the basking turtle and the ocean.

- Remove any project-related debris, trash, or equipment from the beach or dune if not actively being used.
- Do not stockpile project-related materials in the intertidal zone, reef flats, sandy beach and adjacent vegetated areas, or stream channels.

    - tinting or using automatic window shades for exterior windows that face the beach;
    - reducing the height of exterior lighting to below 3 feet and pointed downward or away from the beach; and
    - minimize light intensity to the lowest level feasible and, when possible, include timers and motion sensors.

**Critical Habitat.** There is no federally delineated Critical Habitat in the project area.

### *Conclusion*

Wetland restoration improvements planned under this project would have a positive beneficial impact on the Honu'apo estuary by removing invasive vegetation, re-establishing native vegetation, and increasing overall wetland pond area. Increased open water areas and intertidal mudflats created would provide better habitat for endangered waterbirds to breed and forage within the wetland areas. Predator control included as part of the project would seek to minimize predation impacts to native waterbird populations. Avoidance measures included in this section would minimize potential impacts to wildlife during construction and maintenance activities. No adverse long-term effects to biological resources would occur with implementation of minimization measures above.

## 3.5 HISTORIC, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

A Draft Archaeological Literature Review and a Draft Archaeological Site Preservation Plan were completed for the Honu'apo Estuary Wetland Restoration project by Kulaiwi Archaeology, LLC (both dated March 2025). The reports were prepared in compliance with current historic

preservation review requirements of Section 106 of the National Historic Preservation Act of 1996 and of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD), contained within Hawaii Administrative Rules; Title 13, DLNR; Subtitle 13, State Historic Preservation Rules; Chapter 277, Rules Governing Standards for Archaeological Site Preservation and Development and Chapter 279 Rules Governing Standards for Archaeological Monitoring Studies and Reports. The report identified an 18.25-acre area surrounding the Honu'apo estuary as the Area of Potential Effect (APE). The literature review was conducted to identify any previously identified historic properties within 0.5 miles of the APE and assess the potential for impacts to historic resources as a result of the proposed project. Appendix F includes detailed descriptions of previous archaeological work within the APE and historic resources identified.

### *Summary of Area History*

Honu'apo was an extensive coastal settlement that dates to at least the 1400-1500s; it was one of seven major landing sites along the Ka'ū coast for early Hawaiian voyagers and is well known for its fishpond estuary and village. According to early accounts, the area featured a large village, fishpond, coconut grove, canoe landing, and heiau around the fishpond. The nearby slopes were farmed with sweet potato, dryland taro, bananas, wauke, arrowroot, and plantains. Freshwater springs discharging into the estuary provided water for the residents of the village. The name of the area has been translated to both "turtle poking its head above the water" and "caught turtle".

In 1868 a massive earthquake and resulting tsunami destroyed the village and the surrounding area. Honu'apo remained a well-used fishing and shoreline access point until Honu'apo Bay was dredged and a wharf was constructed in 1883 to serve the needs of the Hutchinson Sugar Company. The Hutchinson Sugar Company was present at Honu'apo from 1881 to 1973. In 1910, the wharf was built and Honu'apo became the means of exporting most of the sugar cane in Ka'ū. The development of the sugar industry also led to the construction of a railroad network, connecting the mills and various buildings within the plantation area. Honu'apo wharf served as a vital transportation hub for various communities, including Wai'ōhinu, Nā'ālehu, Hīlea, and Honu'apo itself.

Use of the port declined in the late 1930s, and in 1946 another tsunami destroyed most of wharf and some of the remaining industrial buildings. After this, much of the area mauka (inland) of Honu'apo Bay, including the estuary, was used for grazing cattle, although the sugar industry maintained a presence until the 1990s. The sugar company dumped industry effluent into the ocean from the adjacent Mill Ditch Road (just northeast of and next to Honu'apo Bay) during a portion of its operation. Due to operational issues with the ditch, the effluent was later discharge on land mauka of the shoreline just north of the estuary. A third tsunami and earthquake in 1975 further destroyed the shoreline, leaving only a few remnants of concrete foundations of the sugar cane and port facilities. The only other historic structure located within Honu'apo lands was a clubhouse and Japanese-style garden constructed in the 1950's on the northern side of Honu'apo Estuary. That building was also destroyed by a tsunami, but garden structures (bridge and debris) remain. Studies also indicated that waste fill disposal during the sugar plantation era likely covered many other archaeological sites, particularly around the estuary (Hawai'i County 2011).

### *Previous Archaeological Research and Cultural Practices*

The results of the literature review indicate that there are 58 archaeological sites located within or within 0.5-miles of the APE. Of these sites, 17 sites have been recommended for preservation, one

of which is located within the 18.25-acre APE. This consists of Site 50-10-74-22353, a complex of eight features documented during an Archaeological Inventory Survey (AIS) conducted by Haun & Associates (2004). The site is located within an around the project site fishpond. The features of the site include a concrete slab (Feature A), two bridges (Features B and C), two water control gates (Features D and E), a set of concrete walls (Feature F), a mortared stone wall (Feature G), and the fishpond itself (Feature H). Site 22353 has elements associated with both the pre-contact and historic use of this area. The Feature H fishpond originated as a pre-contact aquaculture feature. The walls and water control gates located within and adjacent to the fishpond were constructed historically as elements of this aquaculture system. The bridges and the concrete slab are interpreted as recreational facilities constructed and used by Hutchinson Sugar Plantation employees. Site 22353 is unaltered and in fair condition. It was assessed as significant pursuant to HAR Section 13-275-6(b) as an excellent example of a site type (Criterion "c") and for its information content (Criterion "d") by Haun et al. (2004) and was recommended for preservation.

The Honu'apo park lands are an important community resource. In the early 2000s, residents were concerned that a developer submitted plans for luxury estates in the area surrounding the estuary, and it would limit access to the shoreline for local families and fishermen, endanger the remaining habitat, and spur further development. As a result, a group of committed local volunteers formed KOOH to manage the park's expansion and restoration projects at Honu'apo. DOFAW scheduled several meetings with community group KOOH during review of the project to understand the evolution of the project and community context and knowledge. The park is used by the local community for a variety of recreational and cultural activities, including camping, picnicking, dog walking, snorkeling/swimming, fishing, and maintenance and use of the historic fishpond. In a socio-cultural monitoring survey designed to assess how local residents used resources at Honu'apo (completed from November 2008 to November 2009), of the total human-use observations documented, nearly half were for fishing using a variety of methods, including polefishing, shoreline gathering, thrownetting, spearfishing, and lay/gillnetting (Lamson 2010). The estuarine environment of Honu'apo serves as a safe place for many 'ohua (young fish) to grow with minimal predation. The project site is subject to a Loko I'a Program permit from the OCCL, which streamlines the permitting process for the restoration and maintenance of traditional Hawaiian fishpond systems, and improvement of conditions for native species and intentionally-raise species for continued use of this historic fishpond.

## IMPACTS AND MITIGATION MEASURES

Implementation of the proposed wetland restoration project could result in impacts to the archaeological site complex of eight features located within an around the Honu'apo fishpond (Site 22353). The remaining 16 preservation sites within 0.5-miles of the APE would not be impacted by the proposed Honu'apo Estuary Wetland Restoration Project and would be avoided by all construction activity. Protective measures to ensure the preservation of the Site 22353 complex detailed in the Draft Archaeological Site Preservation Plan (ASPP) would ensure no impacts to archaeological sites would occur. The following Draft measures would be required:

**Preservation Mitigation Measures:**
The preservation of Site 22353 will require short-term and long-term protection measures. These measures provide for actions to ensure the site is protected in perpetuity and that damage does not occur through negligent or unintentional means and can be implemented as soon as feasible. On

behalf of the County, the Ka ʻOhana O Honuʻapo group would implement the preservation measures contained in the Draft ASPP and set forth below:[15]

1. Short-Term Conservation Measures
   Short-term conservation measures shall be implemented both prior to and during all phases of the proposed project. These measures shall consist of the installation of a physical barrier set five (5) feet from the sides of Features A through G of the Site 22353 complex (shown in Figure 21 of the ASPP). While no heavy equipment shall be allowed within the 5-foot buffers surrounding Feature A through Feature G, the buckets of the machines shall be permitted to excavate within the buffers to allow dredging. No impacts to the features will be permissible. Due to the nature of the proposed project, and the need to excavate within and adjacent to the fishpond, no temporary physical barrier is proposed for Feature H. The temporary buffer at Features A through G shall be comprised of fencing installed prior to the commencement of any ground altering activity. The fencing shall consist of orange safety fence that is ultraviolet ray resistant high-density polyethylene with diamond or square mesh, with a minimum weight of 20 pounds per 100 feet by 4 feet wide. The installation of the fencing shall be monitored by an archaeologist, and a letter with photographs shall be provided to SHPD after inspection. The fencing shall be removed following the completion of the wetland restoration project.
2. Long-Term Conservation Measures
   The form of preservation for the Site 22353 complex is rehabilitation and restoration. This will be accomplished by protecting the features during and after the proposed project. Long-term conservation measures shall consist of maintaining the current condition of these features. The condition of the site shall be monitored by the KOOH on behalf of the County of Hawaiʻi and any degradation or change shall be reported to SHPD. Site monitoring shall consist of annual or bi-annual inspections, during which photographs shall be taken to document site integrity. As specified in HAR Section 13-277-6 [1-3], site maintenance shall include the bi-annual removal of litter from the fishpond area. This will be the responsibility of the KOOH on behalf of the County and will be conducted on scheduled KOOH work days. The project involves the revegetation of the APE with native plant species. The removal of invasive vegetation on or immediately adjacent to Feature A through Feature G shall be undertaken with small hand tools to prevent inadvertent damage to them.
3. Preservation buffer
   A 5-foot permanent buffer shall be established around Feature A through Feature G, following the temporary buffer described above. No physical barrier shall mark these permanent buffers. A permanent buffer is also proposed for the rehabilitated Feature H pond. This buffer shall be defined by a predator proof fence that would be constructed approximately 50 to 320 feet from the pond edges to prevent predatory animals from impacting the area. Gates shall be installed in the fencing to allow pedestrian and vehicle access.

[15] These measures may be revised following consultation with SHPD and completion of the Final ASPP.

4. Access
   The Site 22353 complex is generally not accessed by the public unless accompanied by members of the KOOH. As indicated in HAR Section 13-277-6 [4], access to the site for cultural practices will be permitted following consultation with KOOH. The proposed project would be completed in phases and would consist of the construction of a walkway that would surround the rehabilitated and restored fishpond, beginning at the Whittington Park existing parking lot. Viewing platforms would be constructed on the north and southwest sides of the pond to encourage viewing from specific areas. A fence would also be constructed around the area to keep predatory animals from impacting the pond. Two gates would be installed to allow pedestrian access, with one at the southwest end of the pond, nearing the parking area, and another along the northeastern end of the enclosing fence. A gate for vehicular access would be located along the inland side of the fence. The SHPD may inspect the Site 22353 without prior notice.
5. Signage
   Warning signs of durable material shall be placed around the perimeter of the Feature H fishpond. General interpretive signs pursuant to HAR Section 13-277-7 shall also be displayed, with the text of the signs submitted to SHPD for review and approval. The signs shall be located to minimize visual impact to the site itself, but located such that their visibility would be guaranteed from any approach. These signs would require maintenance and should be replaced if illegible as a result of defacement or extended wear. All violations shall be reported to SHPD and the Division of Conservation and Resources Enforcement as they are responsible for investigating and prosecuting HRS 6E-11 violations. Warning signs should be written in both Hawaiian and English. The following signage text is suggested:

| PROTECTED SITE | HE WAHI KAPU |
|---|---|
| This is a culturally sensitive and significant Hawaiian ancestral site. Please respect barriers that are intended to protect these fragile resources. Violations can result in a $10,000 fine (Chapter 6E, as amended, Hawai'i Revised Statutes) | He wahi kapu kēia.<br>Mai hana ʻino.<br>Hoʻopaʻi ʻia ka hana ʻino i kēia wahi.<br>(Chapter 6E, as amended, Hawai'i Revised Statutes) |

Because of the previous archaeological studies conducted in the area, there is low probability of encountering unidentified archaeological sites at the project site; however, all members of the project and construction teams should be informed of the possibility of inadvertent cultural finds. In the event any potential historic properties are identified during construction activities, all activities should cease in that area and the SHPD should be notified pursuant to Section 13-280-3, HAR. In the unlikely event that bones are encountered that could be iwi kūpuna (Native Hawaiian ancestral remains), all earth moving activities in the area should stop, the area be cordoned off, and the SHPD notified pursuant to Section 13-300, HAR. In the event that iwi kūpuna and/or cultural finds are encountered during construction, cultural and lineal descendants of the area should be consulted to develop a reinterment plan and cultural preservation plan for proper cultural protocol, curation, and long-term maintenance. With implementation of the above conditions, no adverse effect to cultural, historic, or archaeological resources would occur.

The State of Hawai'i's environmental review process also requires consideration of the proposed project's potential effects on cultural practices and cultural features to "promote responsible decision making" (HRS Section 343). These cultural practices and features may include traditional cultural properties, which are designated significant historic properties that "have an important value to the native Hawaiian people or to another ethnic group of the [S]tate due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity" (HAR Sections 13-275-6 and 13-284-6). The intent of the assessment is to "analyze the impact of a proposed action on cultural practices and features associated with the project area" (OEQC 1997). Cultural practices at the fishpond would continue following implementation of the wetland improvements. While the predator proof fence would limit entry to the fishpond at precise locations, public access to the site would be allowed via two gates for pedestrian access, one at the southwest end of the pond, nearing the parking area, and another along the northeastern end of the enclosing fence. Because the proposed project represents a continuation of existing uses and would improve conditions at the loko i'a, it is reasonable to conclude that, pursuant to Act 50, the exercise of Native Hawaiian rights, or any ethnic group, related to gathering, access, or other customary activities within the project area would not be negatively affected, and there would be no direct adverse effect upon cultural practices or beliefs.

## 3.6 AIR QUALITY AND CLIMATE

Hawai'i receives most of its precipitation during the winter months (October to April). Flooding is more likely during this wet period, and stream flows decrease during drier conditions from May to September. The temperature in the Na'alehu area ranges from 65 to 79 degrees Fahrenheit (F). Mean annual rainfall in the Na'alehu area is about 48 inches (U.S. Climate Data 2025).

In the Hawaiian Islands, the predominant wind direction is from the northeast (trade winds). As a result of the trade winds, air quality in Hawai'i is generally very good. Ongoing volcanic activity at the summit and East Rift Zone of Kīlauea Volcano, on the Island of Hawai'i, creates the potential for airborne health hazards from vog[16] to residents and visitors. Vog mostly affects the Kona coast on the west side of the island since the prevailing trade winds blow the vog to the southwest and southern winds, which then blow it north up the Kona coast toward Kohala. When the winds shift and blow towards the south (Kona winds), the vog plume moves over the Ka'ū District and may impact Honu'apo.

The Department of Health, Clean Air Branch (CAB), monitors the ambient air in the State of Hawai'i for various gaseous and particulate air pollutants. The U. S. Environmental Protection Agency (EPA) has set national ambient air quality standards (NAAQS) for six criteria pollutants: carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, ozone, and particulate matter ($PM_{10}$ and $PM_{2.5}$). Hawai'i has established state ambient air standards for all of these pollutants (except for $PM_{2.5}$) in addition to hydrogen sulfide, a product of volcanic emissions (CAB 2022). The primary purpose of the statewide monitoring network is to measure ambient air concentrations of these pollutants and ensure that these air quality standards are met.

[16] The term vog refers to the hazy air pollution caused by volcanic emissions, which are primarily water vapor, carbon dioxide, and sulfur dioxide gas.

In 2023, there were 10 air monitoring stations on the island of Hawai‘i. The majority of stations are located on the Island of Hawai‘i to measure air quality impacts from the volcano and geothermal energy production. There are monitoring stations located in Pāhala and Nā‘ālehu, in the general vicinity of the project site. According to the State of Hawai‘i Department of Health Annual Summary 2023 Air Quality Data, criteria pollutant levels in the State remained below all federal and state ambient air quality standards (excluding exceedances due to volcanic activity since they are considered natural events) (CAB 2024).

### IMPACTS AND MITIGATION MEASURES

Construction of the proposed project could result in temporary air quality effects, including exhaust emissions from construction vehicles and dust generated by short-term construction related activities. Components of construction emissions include employee trips, exhaust emissions from construction equipment, and fugitive dust emissions. Excavation and grading within the project area could generate airborne dust particulates.

Dust control measures such as watering and sprinkling will be implemented as needed to minimize wind-blown dust. To minimize construction-related exhaust emissions, project contractors will ensure that all internal combustion engines are maintained in proper working order. All construction work will be in conformance with the air pollution control standards contained in HAR Title 11, Chapter 59, "Ambient Air Quality Standards," and Chapter 60, "Air Pollution Control," which would minimize air quality emissions.

Once completed, the proposed wetland restoration project would not result in any new air emissions, since vehicle trips from park staff and volunteers would continue with project implementation. There would be no long-term adverse air quality impacts associated with the proposed action. Other than passing vehicles on nearby roadways, there are no air contaminant sources in the immediate project area.

## 3.7 NOISE

Surrounding noise levels in the vicinity of the project site are considered relatively low. Existing noise sources include the sound of waves washing up on the shoreline, wind blowing, occasional vehicular traffic entering and leaving the park, and human conversations and radio music from park visitors. County DPR maintenance staff periodically mow the grass in park areas and use heavy equipment; however, the noise occurs infrequently.

### IMPACTS AND MITIGATION MEASURES

Noise impacts from a project can be categorized as those resulting from construction and those from operational activities. Construction noise would have a short-term effect; operational noise would continue throughout the lifetime of the project. Implementation of the proposed wetland improvements could temporarily increase noise levels during construction. Noise from construction activities is regulated under Title 11, Chapter 46 (Community Noise Control) of the State DOH's Administrative Rules. The zoning district classification and maximum permissible sound levels are outlined in HAR Section 11-46-4. The project falls under the Class C zoning district category that applies to properties zoned for agriculture, country, industrial, or similar types of land uses. The maximum permissible noise level for this site under Class C is 70 dBA at the property line during

daytime and 70 dBA during nighttime. Typical ranges of construction equipment noise vary between 70 and 95 dBA. Therefore, earthmoving activities could temporarily increase noise levels during construction above maximum allowable limits that would impact nearby existing public uses.

A Community Noise Permit for construction activities may be required by the State DOH. Prior to construction, consultation with the State DOH will occur to determine permitting requirements. Should the permit be required, allowable construction conditions will be specified. Construction will be confined to 7 a.m. to 6 p.m., Monday through Friday, and 9 a.m. to 6 p.m. on Saturday. No construction activities exceeding maximum allowable noise levels will occur on Sundays and holidays without prior notice. Construction activities will comply with HAR Chapter 11-46, "Community Noise Control."

There would be no long-term increase in noise during project operations since the project includes restoration of an existing wetland pond at the Honuʻapo estuary. Further, the project would not generate additional traffic and associated noise.

## 3.8 VISUAL RESOURCES

The project area includes wetland marsh, including vegetated areas surrounding the wetlands and the uplands directly adjacent to the wetland area. Due to the relatively level topography of the project site and the low-level vegetation near the shoreline, views of the Kaʻū coastline and uplands are visible. These views provide a striking panorama of the rugged and wild beauty of Kaʻū (County of Hawaiʻi 2011).

### IMPACTS AND MITIGATION MEASURES

During construction, workers, materials, and equipment would be visible from Whittington Beach Park to the southwest and from motorists on the park road entrance. Visual impacts during construction would be temporary and intermittent.

Since the proposed project consists of wetland restoration within the Honuʻapo Estuary, the majority of proposed project improvements would not significantly change the scenic and visual character of the surrounding area. The predator proof fence and pedestrian walkway and viewing platforms would result in a visual addition to the landscape. However, restoration improvements should have a beneficial impact by improving this estuary as a scenic resource.

## 3.9 SOCIAL AND ECONOMIC CHARACTERISTICS

In both urban and rural areas, the County of Hawaiʻi has relatively low population density, though there has been a marked growth in population. From 2020 to 2023, the Hawaiʻi County population increased from 200,629 to 207,615 persons, which represents an estimated 1.1 percent annual growth rate. In comparison, within the Nāʻālehu Census Data Place (CDP), the population decreased from 890 persons in 2020 to 837 in 2023, about a 2 percent decrease.

While historically the primary industry for Hawaiʻi County was agriculture (sugar), the more recent major economic activities for Hawaiʻi County include government, accommodation and food services, and retail trade, similar to the State (DBEDT 2023). Honuʻapo is a protected area, emphasizing conservation and restricted agriculture.

The Honu'apo lands are an important recreational resource for residents in the area, and the Honu'apo estuary provides opportunities for sustainable recreational and subsistence fishing, and upholding cultural traditions as a loko i'a. Through KOOH and other organizations, community members have participated as volunteers in the restoration of the fishpond at Honu'apo.

### IMPACTS AND MITIGATION MEASURES

The proposed project is not anticipated to have significant, adverse impacts on the social and economic characteristics of the area. The proposed improvements would enhance the Honu'apo estuary and provide additional wetland habitat for Hawaiian waterbirds. The proposed restoration activities would not generate any new permanent full-time jobs; however, KOOH anticipates hiring a local part-time contractor to support wetland restoration, site caretaking, environmental education, and maintenance efforts beginning in early 2026. Therefore, the primary economic effects would be associated with short-term construction jobs and a part-time maintenance job that would generate a small minor positive economic impact.

Implementation of the proposed action would not displace any residents or businesses since project improvements would occur in an open space area. Improvements planned under the proposed wetland restoration would not impact the number of housing units in the surrounding area and surrounding communities because no housing units are included under this project.

The proposed restoration improvements would enhance Honu'apo estuary's value as a wetland habitat for Hawaiian waterbirds, and the cultural significance as a historic fishpond. The involvement of KOOH and community volunteers as covered under the loko i'a program provides a community-based management and protection system that incorporates traditional cultural values and management techniques.

## 3.10 PUBLIC FACILITIES AND SERVICES

The Honu'apo Estuary Wetland is a natural resource and is not served by any utility services. The project site is not served by public water or wastewater services, or connected to stormwater facilities. There is no electrical, telecommunications, or solid waste service provided to the project site since it is a wetland and wildlife area. Electricity is provided at Whittington Beach Park for lighting of the existing pavilions and restrooms.

### IMPACTS AND MITIGATION MEASURES

The proposed project includes the restoration of a wetland pond within the Honu'apo park lands. Guinea grass dominates the inland disturbed areas of Honu'apo lands and is targeted for control in the Resources Management Plan in part to reduce wildfire risk. No feature of the project would result in the need for new or altered services for fire or police protection, schools, libraries, parks, or health services. Because no new residences would be constructed on site, and any new employee would be likely drawn from the local labor pool, no increase in population would result from the proposed project. Therefore, no increases in the demands for public services such as schools, libraries, parks, health services, police, or fire protection would be expected, and no additional public facilities would need to be constructed. Further, activities at the proposed wetland restoration project site would not affect the provision of utilities and public services to adjacent land uses.

Restoration improvements planned are expected to have no negative long-term impact on utilities and public services.

For information regarding storm drainage, see Section 3.2, *Hydrology and Water Quality*.

## 3.11 TRAFFIC AND TRANSPORTATION

Vehicle access to the project area is via Māmalahoa Highway (Hawai'i Belt Road). The paved park roadway provides access to Whittington Beach Park and two parking areas for the park lands. Māmalahoa Highway (Hawai'i Belt Road) provides regional access to the area.

### IMPACTS AND MITIGATION MEASURES

Construction of the proposed project could result in short-term increases in traffic. During restoration of the pond and again during soil hauling for disposal, there would be work vehicles using area roadways. However, this short-term increase in roadway use would not adversely impact traffic flow or levels of service for project area roadways.

There would be no direct increase in operational traffic due to implementation of the proposed project, and no long-term adverse effects to transportation and traffic would occur.

For a discussion of project consistency with alternative transportation plans, see Section 3.12, *Conformance with State and Local Plans, Policies, and Land Use Controls*.

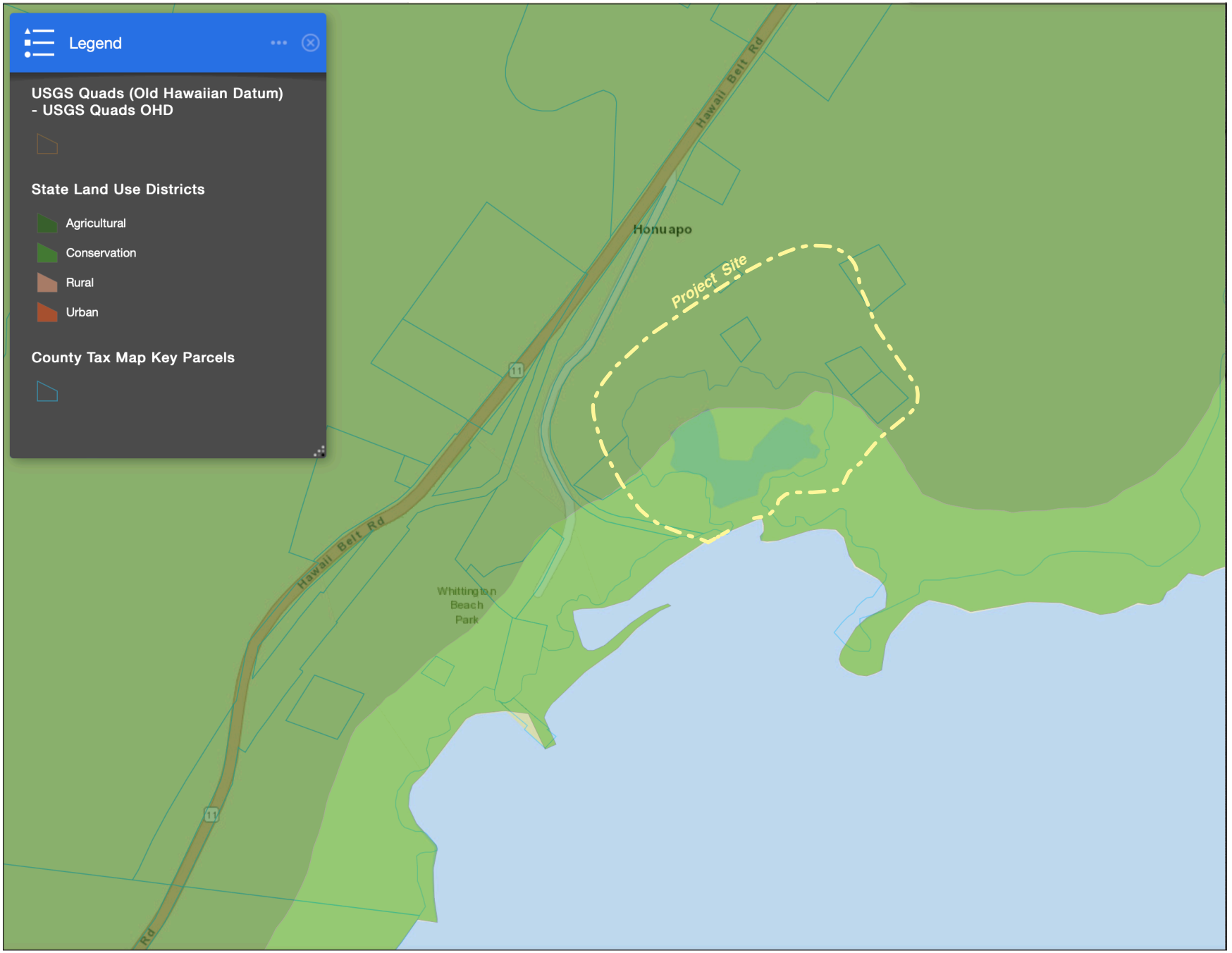
## 3.12 CONFORMANCE WITH STATE AND LOCAL PLANS, POLICIES, AND LAND USE CONTROLS

State and county policy, and land use and community plans and controls are established to address the long-term physical, social, economic, and environmental needs in Hawai'i. Pertinent land use controls for the Honu'apo Estuary Wetland Restoration project are described below.

### *State of Hawai'i*

**State of Hawai'i, Land Use Commission – State Land Use Districts**
HRS Chapter 205 establishes four major land use districts in which all lands in the State are placed. These districts include urban, rural, agricultural, and conservation. The Conservation District has five subzones: Protective, Limited, Resource, General, and Special. Excluding the Special subzone, the four subzones are arranged in a hierarchy of environmental sensitivity, ranging from the most environmentally sensitive (Protective) to the least sensitive (General). These subzones define a set of identified land uses that may be allowed by discretionary permit as regulated by HAR Chapter 13-5 "Conservation District" and HRS Chapter 183C.

The wetland and surrounding area are within the Agricultural District and the Conservation District, with portions of the project site within a Resource Subzone designation (Figure 11). The objective of the resource subzone is to ensure the sustainable use of the natural resources of those areas, and in the case of the project site, encompass submerged lands owned by the State of Hawai'i and lands used for county parks (HAR Section 13-5-13). Permitted land uses and activities within Conservation District zones are restricted and generally require a Conservation District Use Permit or Site Plan Approval from the DLNR or the Board of Land and Natural Resources (BLNR).




*Honu'apo Estuary Wetland Restoration*

SOURCE: State of Hawai'i Land Use District Boundaries Map, 2018; Hawaii State GIS Program

**Figure 11**

State Land Use District Map

As provided by the Office of Conservation and Coastal Lands (OCCL) in their early comment letter (see Appendix A), the creation or "sculpting of deepened water areas" in the fishpond at Honu'apo would trigger the need for a Conservation District Use Permit from the BLNR pursuant to HAR Section 13-5-25 R-5 Marine construction (D-1) *Dredging, filling, or construction on submerged lands, including construction of harbors, piers, marinas, and artificial reefs*. However, it appears that some of the proposed work is consistent with work that was approved by the existing KOOH Loko I'a permit HA: 19:02, while the proposed predator proof fence, pedestrian gate, walkway with viewing platforms, and grading of deepened water areas within the pond on submerged lands would require additional review and potentially authorization from the Department or BLNR. Since applications for proposed land uses require signature of the landowners, the creation of deepend water areas on State submerged lands may require a land disposition and/or lease for DOFAW, the County of Hawai'i, and KOOH to co-manage the fishpond area. These agreements are currently in process. Application has been made for a Tier 3 Loko I'a permit (in addition to the existing Tier 1 permit issued in 2019) for the mechanical removal of invasive vegetation around the pond and the dredging of sediment-accumulated areas within the pond.

The fishpond restoration at Honu'apo under the Loko I'a permit would be considered compatible with the proposed wetland restoration activities. As stated above, the removal of invasive vegetation and revegetation with native plants species, and the creation of deepened water areas in the pond is consistent with activities approved with the existing KOOH Loko I'a permit. While the proposed predator fence may not be within the scope of the Loko I'a program, predation at Honu'apo has been identified as one of primary threats to birds and wildlife at the estuary. The proposed walkway and pedestrian access would limit recreation activities to designated areas that would minimize disturbance to avian species using the site. By protecting species in the wetland, the proposed project in conjunction with the fishpond restoration would benefit biological diversity, promote sustainable recreational and subsistence fishing, and preserve cultural traditions.

**Hawaii State Planning Act, HRS Chapter 226, Hawai'i Revised Statutes**

The Hawaii State Planning Act (HRS Chapter 226) is a broad policy document that forms a basis for all activities, programs, and decisions made by local and state agencies. The Act sets forth the Hawaii State Plan, which is a long-range comprehensive plan that identifies the goals, objectives, policies, and priorities for the State, and provides a basis for determining priorities and allocating limited resources. The objectives and policies focus on general topic areas, including population, economy, physical environment, facility systems, and socio-cultural advancement. Applicable sections of HRS Chapter 226 to the proposed project are discussed in Table 1 below.

**Table 1. Consistency with Hawaii State Planning Act, HRS Chapter 226**

| Section | Policy | Consistency | Discussion |
|---|---|---|---|
| §226-5: Population | 3. Promote increased opportunities for Hawaii's people to pursue their socio-economic aspirations throughout the islands. | Yes | The proposed wetland restoration project would provide an opportunity for employment during the construction phase of the project. |
| §226-6: Economy—in general | 9. Strive to achieve a level of construction activity responsive to, and consistent with, state growth objectives. | Yes | The proposed wetland restoration project would provide economic stimulus and opportunity for employment during the construction phase of the project. |

| Section | Policy | Consistency | Discussion |
|---|---|---|---|
| §226-6: Economy—in general | 19. Promote and protect intangible resources in Hawaii, such as scenic beauty and the aloha spirit, which are vital to a healthy economy. | Yes | The proposed project would also continue to provide a community resource that would engender aloha spirit within the community, and protect and enhance the scenic resources of the estuary. |
| §226-7: Economy—agriculture | 17. Perpetuate, promote, and increase use of traditional Hawaiian farming systems, such as the use of loko iʻa, māla, and irrigated loʻi, and growth of traditional Hawaiian crops, such as kalo, ʻuala, and ʻulu. | Yes | The proposed project includes restoration activities that would support continued use of the historic loko iʻa. The management of the loko iʻa / estuary will serve as an example of how best community-based management practices of cultural resource and natural resource co-exist. |
| §226-8: Economy—visitor industry | N/A | – | – |
| §226-9: Economy—federal expenditures | N/A | – | – |
| §226-10: Economy—potential growth and innovative activities | N/A | – | – |
| §226-10.5: Economy—information industry | N/A | – | – |
| §226-11: Physical environment—land-based, shoreline, and marine resources | 1. Exercise an overall conservation ethic in the use of Hawaii's natural resources. | Yes | The proposed project would restore a wetland and loko iʻa that would continue to provide for a variety of activities. The project would create improved wetland habitat for Hawaiian waterbirds and other native species, include construction BMPs to minimize impacts to water resources, and protect rare or endangered species. Restoration would also provide opportunities for public education on coastal wetland ecosystems. |
| §226-11: Physical environment—land-based, shoreline, and marine resources | 2. Ensure compatibility between land-based and water-based activities and natural resources and ecological systems. | Yes | See above. |
| §226-11: Physical environment—land-based, shoreline, and marine resources | 3. Take into account the physical attributes of areas when planning and designing activities and facilities. | Yes | See above. |
| §226-11: Physical environment—land-based, shoreline, and marine resources | 4. Manage natural resources and environs to encourage beneficial and multiple use without generating costly or irreparable damage. | Yes | See above. |
| §226-11: Physical environment—land- | 5. Consider multiple uses in watershed areas, provided such uses do not detrimentally affect | Yes | See above. |

| Section | Policy | Consistency | Discussion |
|---|---|---|---|
| based, shoreline, and marine resources | water quality and recharge functions. | | |
| §226-11: Physical environment—land-based, shoreline, and marine resources | 6. Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii. | Yes | See above. |
| §226-11: Physical environment—land-based, shoreline, and marine resources | 8. Pursue compatible relationships among activities, facilities, and natural resources. | Yes | See above. |
| §226-11: Physical environment—land-based, shoreline, and marine resources | 9. Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes. | Yes | See above. |
| §226-12: Physical environment—scenic, natural beauty, and historic resources | 1. Promote the preservation and restoration of significant natural and historic resources. | Yes | The proposed project includes preservation and protection of historic resources and cultural practices at the loko iʻa. An Archaeological Literature Review was completed to ensure no adverse impact to historic and cultural resources. |
| §226-12: Physical environment—scenic, natural beauty, and historic resources | 4. Protect those special areas, structures, and elements that are an integral and functional part of Hawaii's ethnic and cultural heritage. | Yes | See above. |
| §226-12: Physical environment—scenic, natural beauty, and historic resources | 5. Encourage the design of developments and activities that complement the natural beauty of the islands. | Yes | See above. |
| §226-13: Physical environment—land, air, and water quality | 1. Foster educational activities that promote a better understanding of Hawaii's limited environmental resources. | Yes | The proposed wetland restoration project would provide additional habitat for study and would allow for compatible environmental education programs and opportunities. |
| §226-13: Physical environment—land, air, and water quality | 2. Promote the proper management of Hawaii's land and water resources. | Yes | See above. |
| §226-13: Physical environment—land, air, and water quality | 3. Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters. | Yes | The project includes BMPs to be implemented during project construction to minimize erosion and potential impacts to water quality. |
| §226-13: Physical environment—land, air, and water quality | 4. Encourage actions to maintain or improve aural and air quality levels. | Yes | All construction work will be in conformance with the air pollution control standards. |
| §226-13: Physical environment—land, air, and water quality | 5. Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, | Yes | As described in Section 3.3, *Natural Hazards and Climate Change*, of this EA, implementation of the proposed project would not result in increased |

| Section | Policy | Consistency | Discussion |
|---|---|---|---|
| | earthquakes, volcanic eruptions, and other hazards. | | flooding or hazards from flooding in surrounding areas. |
| §226-13: Physical environment—land, air, and water quality | 6. Encourage design and construction practices that enhance the physical qualities of Hawaii's communities. | Yes | The project includes restoration of an existing wetland resource. |
| §226-13: Physical environment—land, air, and water quality | 8. Foster recognition of the importance and value of the land, air, and water resources to Hawaii's people, their cultures, and visitors. | Yes | See above. |
| §226-14 through §226-22 (various) | N/A | – | – |
| §226-23: Socio-cultural advancement—leisure | 2. Provide a wide range of activities and facilities to fulfill the cultural, artistic, and recreational needs of diverse groups. | Yes | The proposed wetland restoration project would provide additional habitat for native species and an improved loko i'a, which would support increased public awareness and appreciation of Honu'apo Estuary Wetland as an important natural resource. The proposed project would provide for a continued variety of activities and cultural practices. |
| §226-23: Socio-cultural advancement—leisure | 3. Enhance the enjoyment of recreational experiences through safety, education, and improved facility design. | Yes | (see discussion above) |
| §226-23: Socio-cultural advancement—leisure | 4. Promote the recreational and educational potential of natural resources while preserving their inherent values. | Yes | (see discussion above) |
| §226-23: Socio-cultural advancement—leisure | 5. Ensure opportunities for everyone to use and enjoy Hawaii's recreational resources. | Yes | (see discussion above) |
| §226-23: Socio-cultural advancement—leisure | 10. Assure adequate access to significant natural and cultural resources in public ownership. | Yes | (see discussion above) |
| §226-24: Socio-cultural advancement—individual rights | N/A | – | – |
| §226-25: Socio-cultural advancement—culture | 1. Foster increased knowledge and understanding of Hawaii's ethnic and cultural heritages and history. | Yes | An Archaeological Literature Review and analysis was completed to ensure implementation of the proposed project would not adversely impact historic and cultural resources at the site. The proposed project would include preservation and protection of historic resources and cultural practices at the loko i'a. |

| Section | Policy | Consistency | Discussion |
|---|---|---|---|
| §226-26: Socio-cultural advancement—public safety | N/A | – | – |
| §226-27: Socio-cultural advancement—government | 2. Pursue an openness and responsiveness in government that permits the flow of public information, interaction, and response. | Yes | There are multiple opportunities for public participation, including community meetings, the EA process, and the public hearing for the Special Management Area permitting process. |
| §226-27: Socio-cultural advancement—government | 5. Assure that government attitudes, actions, and services are sensitive to community needs and concerns. | Yes | The proposed wetland restoration is intended to improve and protect natural resources for the community. |

**Coastal Zone Management Program**

In October 1972, Congress passed the Coastal Zone Management Act for the purpose of establishing a national program for the management, beneficial use, protection, and development of land and water resources of the coastal areas of the United States. The Hawai'i Coastal Zone Management (CZM) Program (HRS Chapter 205A) was promulgated in 1977 in response to the Federal Coastal Zone Management Act of 1972. The objectives and policies of the CZM Program are to provide recreational resources; protect historic, scenic, and coastal ecosystem resources; provide economic uses; reduce coastal hazards; and manage development in the coastal zone. All lands in the State of Hawai'i are located within the coastal zone management area.

When Honu'apo was acquired by the State of Hawai'i, NOAA committed funds for the purchase through the Coastal and Estuarine Land Conservation Program. The specifications for planned uses on lands purchased with a CELCP grant as set forth in the RMP would apply to the proposed project:

- The general public should be allowed access to the property. For this purpose, user fees should not be charged, or if so, the amount of the fee should comply with the local state standard. All revenues accumulated from the fees shall only be used for maintenance or management of the property.
- Activities that are considered consistent with the conservation purposes of the grant include: resource protection, restoration and enhancement, such as vegetative erosion control; recreational activities, such as hiking, hunting and fishing; access for swimming, kayaking and canoeing; research and educational activities. Small scale construction, such as restrooms or boardwalks for the purpose of facilitating activities is allowed.
- Activities generally considered to be inconsistent include: active agricultural or aquaculture production, shoreline armoring or other hard erosion control structures, expansion of roads, facilities for active recreation such as sport facilities, water parks, playgrounds, etc.
- Pre-existing uses on the property should not be expanded or converted to other uses without prior approval of NOAA.

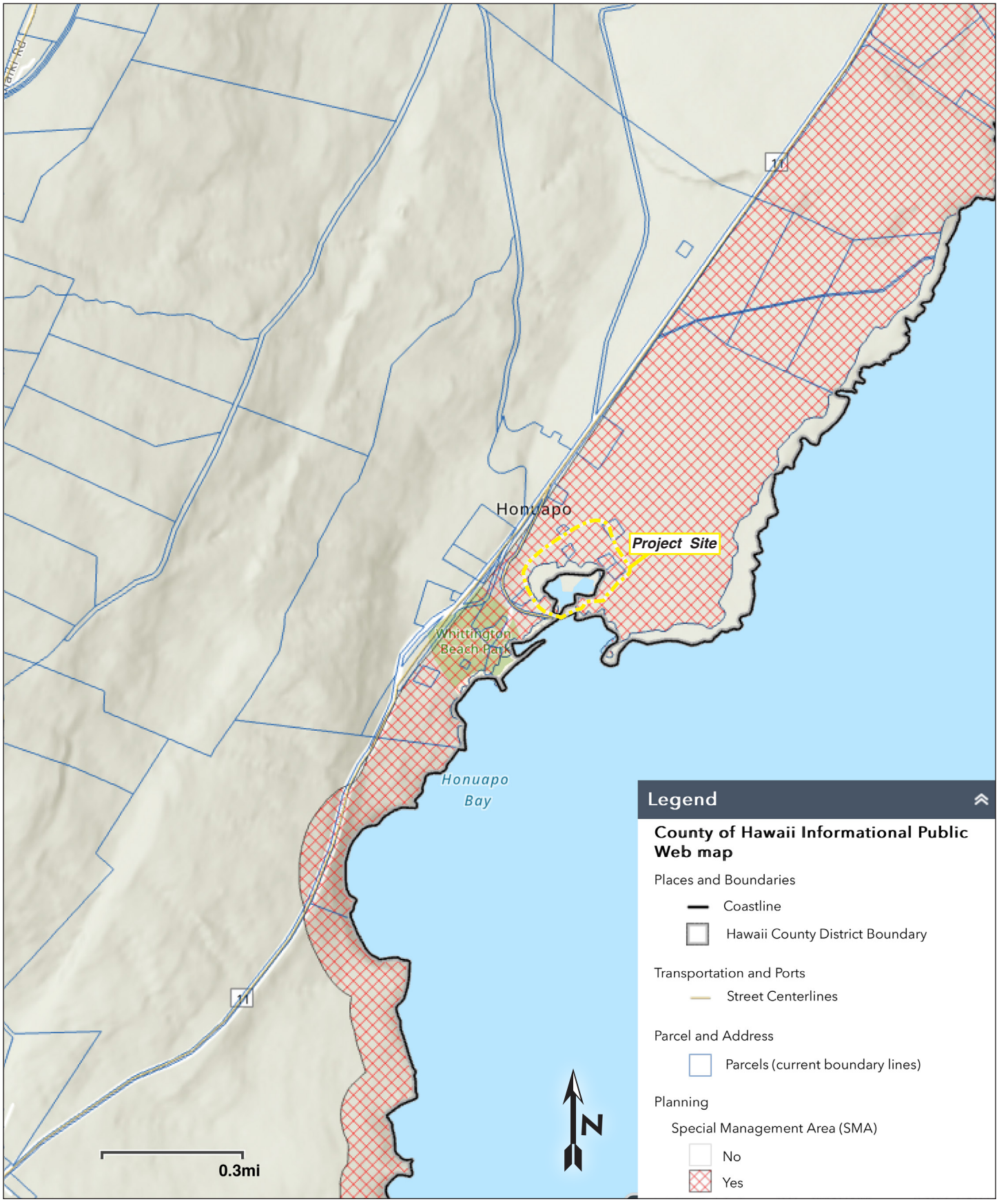
Consultation with the State of Hawai'i Office of Planning will occur during the permitting process with the U.S. Army Corps of Engineers for CZM federal consistency review.

*Special Management Area Designation and Shoreline Setback Rules*

The CZM Program outlines controls and policies within an area along the shoreline called the Special Management Area (SMA). The objectives of the SMA are "the maintenance, restoration, and enhancement of the overall quality of the coastal zone environment, including, but not limited to, its amenities and aesthetic values, and to provide adequate public access to publicly owned or used beaches, recreation areas and national reserves." The purpose of the SMA Permit is to regulate any use, activity or operation that qualifies as a "development" and is administered at the county level – the permit is a management tool to ensure activities within the SMA are carried out in compliance with the CZM objectives and policies, and SMA guidelines.

The project site is located within the SMA boundary (see Figure 12). Consultation with the County of Hawai'i Planning Department was initiated at the time of early consultation and EA preparation. It is anticipated that an SMA Major permit would be necessary, based on the project valuation and preliminary understanding of the project scope. After issuance of the Final Environmental Assessment and FONSI, a SMA permit application will be submitted.

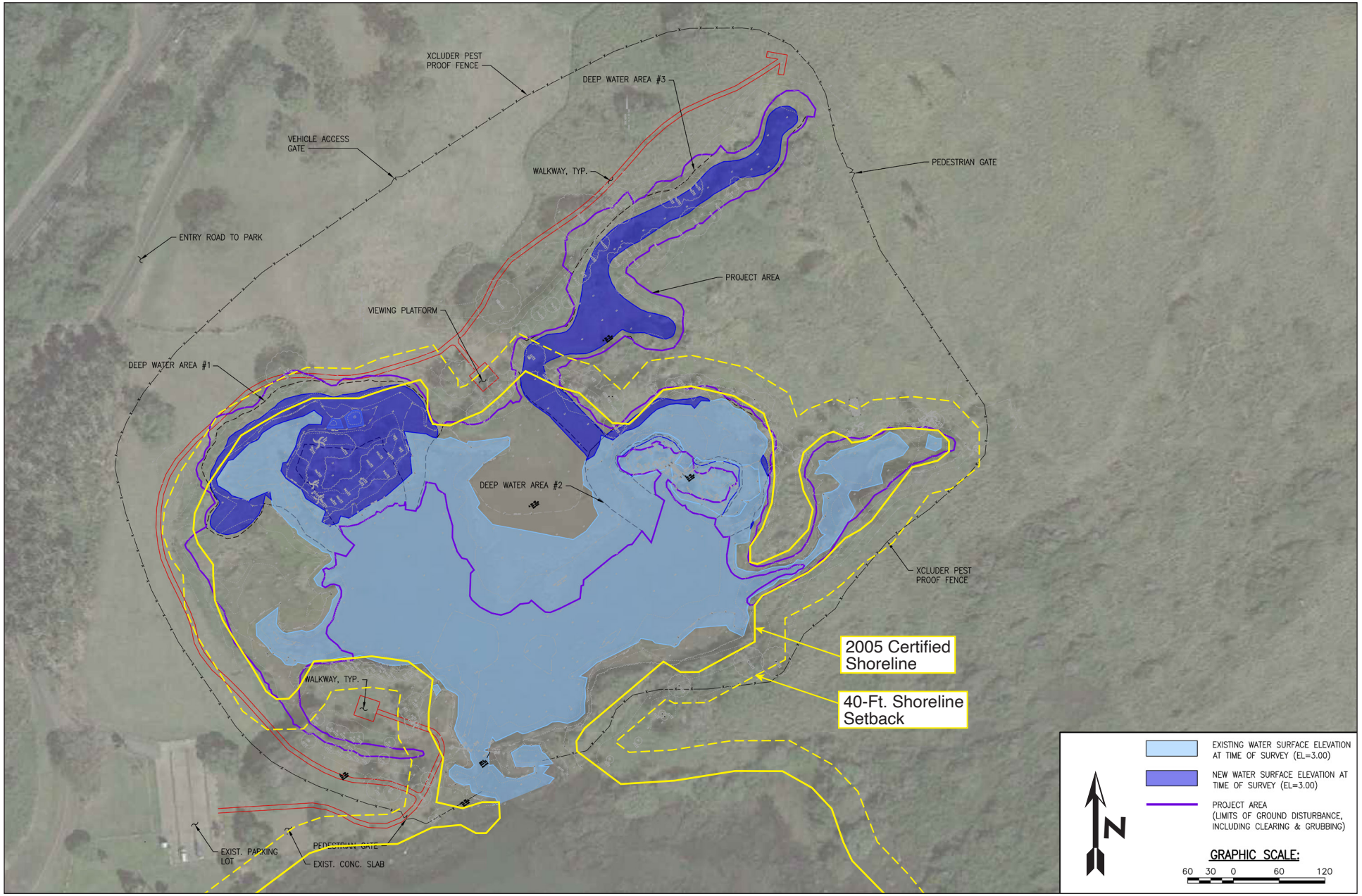
The proposed action requires compliance with the Shoreline Setback Rules of the County of Hawai'i Planning Department (Planning Department Rule 11-5). The shoreline at the project site was certified on February 18, 2005, and follows along in some sections the debris line, top of pond bank, and along the highwater mark (Appendix G for a copy of the certified shoreline survey). The Shoreline Setback area is the area between the shoreline and the shoreline setback line established by the County. Structures or portions of a structure are not permitted in the shoreline setback area without a variance, and conditions must be imposed to maintain safe lateral access to and along the shoreline or adequately compensate for its loss; to minimize risk of adverse impacts on beach processes; to minimize risk of structures failing and becoming loose rocks or rubble on public property; and to minimize adverse impacts on public views to, from, and along the shoreline. Project activities would occur within the shoreline setback area, including grading, and placement of portions of the walkway and fencing (see Figure 13). A Shoreline Setback Variance would be required for activities in the shoreline setback area (e.g., grubbing, grading, and portions of the fence line). The Shoreline Setback Variance would trigger the need for an EA (Hawai'i Planning Department Rule 11-10). While only those activities within the shoreline setback area trigger compliance with HRS Chapter 343, the entirety of the proposed action is evaluated in this EA (HAR Section 11-200.1-10).




*Honu'apo Estuary Wetland Restoration*

SOURCE: County of Hawai'i Geographic Information System Maps 2023

**Figure 12**
Special Management Area Map




SOURCE: Bow Engineering 2025

*Honu'apo Estuary Wetland Restoration*

**Figure 13**
Shoreline Setback Area

The following discussion evaluates the consistency of the proposed Honu'apo Estuary Wetland Restoration project with the applicable objectives and policies of HRS Chapter 205A. The policies of HRS Chapter 205A, the consistency of the proposed wetland improvements with those policies, and the reasoning for the conclusion are set forth in the table below.

Policy compliance is often a matter of interpretation. The County Council is the ultimate arbiter of public policy for the project, and their judgment regarding the project and a specific policy may be different from that set forth in this report. Therefore, the following policy evaluation should be viewed as preliminary, with the ultimate decision to be made by the appropriate appointed and elected officials.

**Table 2. Consistency with Coastal Zone Management Program, HRS Chapter 205A-2**

| Objective/Policy | Objective or Policy Text | Consistency | Discussion |
|---|---|---|---|
| Objective (1)(A) | Provide coastal recreational opportunities accessible to the public. | Yes | The Honu'apo Estuary Wetland allows for passive recreational and educational uses, predominantly through its use as a loko i'a. The proposed project would have a beneficial impact to these passive uses while minimizing impacts to the wetland since it would provide installation of a pedestrian walkway and viewing platforms. |
| Policy (1)(B)(iii) | Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by: Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value. | Yes | See above. |
| Policy (1)(B)(v) | Ensure public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources. | Yes | See above. |
| Objective (2)(A) | Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture. | Yes | As set forth in Section 3.5, *Historic, Archaeological, and Cultural Resources*, an Archaeological Literature Review and Archaeological Site Preservation Plan was completed for the project site. The archaeological review identified one historic complex of eight features. Mitigation measures to preserve historic resources have been included in Section 3.5 above. |
| Policy (2)(A) | Identify and analyze significant archaeological resources. | Yes | See above. |
| Policy (2)(B) | Maximize information retention through preservation of remains and artifacts or salvage operations. | Yes | See above. |

| Objective/Policy | Objective or Policy Text | Consistency | Discussion |
|---|---|---|---|
| Policy (2)(C) | Support state goals for protection, restoration, interpretation, and display of historic resources. | Yes | See above. |
| Objective (3)(A) | Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources. | Yes | The construction of the proposed wetland would improve the overall visual character of the project site and would be consistent with the existing wetland uses of the area. |
| Policy (3)(B) | Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline. | Yes | See above. |
| Policy (3)(C) | Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources. | Yes | See above. |
| Objective (4)(A) | Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems. | Yes | The objective for the proposed project is to restore habitat for native Hawaiian waterbirds within the Honu'apo Estuary Wetland. The proposed action is required to obtain a NPDES permit to reduce potential impacts to water quality during construction of the project. Adverse effects to water quality from stormwater flows would be minimized by site-specific BMPs (see Section 3.2 above). |
| Policy (4)(A) | Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources. | Yes | See above. |
| Policy (4)(E) | Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures. | Yes | See above. |
| Objective (5)(A) | Provide public or private facilities and improvements important to the State's economy in suitable locations. | Yes | The Honu'apo estuary is an important wetland feature for residents of the area. As evaluated in this EA, adverse environmental impacts from implementation of the proposed action would be minimized through project design and mitigation measures contained in this document. |
| Objective (6)(A) | Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution. | Yes | As described in Section 3.3, *Natural Hazards and Climate Change*, of this EA, the project site is located in a tsunami evacuation zone. The proposed improvements would be designed |

| Objective/Policy | Objective or Policy Text | Consistency | Discussion |
|---|---|---|---|
| | | | and constructed in conformance with the standards and requirements of the Hawai'i County Code, Chapter 27, *Floodplain Management*, as applicable. In addition, the project includes BMPs to be implemented during project construction to minimize erosion and potential impacts to water quality. |
| Policy (6)(B) | Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint source pollution hazards. | Yes | See above. |
| Policy (6)(C) | Ensure that developments comply with requirements of the Federal Flood Insurance Program. | Yes | See above. |
| Objective (7)(A) | Improve the development review process, communication, and public participation in the management of coastal resources and hazards. | Yes | Early consultation with agencies, organizations, and individuals was conducted during preparation of the Draft EA for the proposed project. Additional public review will occur during the public comment period for the EA, and during the public hearing before the County of Hawai'i Planning Commission during the SMA permit process. |
| Objective (8)(A) | Stimulate public awareness, education, and participation in coastal management. | Yes | See above. |
| Policy (8)(A) | Promote public involvement in coastal zone management processes. | Yes | See above. |
| Objective (9)(A) | Protect beaches for public use and recreation. | Yes | The proposed project would not have a direct impact on public beaches; the project area would continue to be protected as a wetland with project implementation. |
| Objective (10)(A) | Promote the protection, use, and development of marine and coastal resources to assure their sustainability. | Yes | As evaluated in this EA, adverse environmental impacts from implementation of the proposed action would be minimized through project design and mitigation measures contained in this document. |
| Policy (10)(A) | Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial. | Yes | See above. |

### *County Land Use Plans and Policies*

#### County of Hawaii General Plan

The *County of Hawaii General Plan* (2005) is a long range, generalized planning policy document to guide development of the county. It serves as a basis for an implementation program to effectuate desired changes and improvements in the social, economic, and environmental atmosphere of the county. Topics addressed in the General Plan include goals and policies regarding population, land

use, the environment, cultural resources, economic activity, housing and urban design, transportation, social infrastructure, and government. As set forth by the General Plan 2005: "Through the Zoning and Subdivision codes, and the Special Management Area and shoreline setback regulations, the County of Hawaii has the means to protect the island's natural and scenic beauty as an integral part of the living environment of the island." These land use regulations and how they apply to the proposed project are described throughout this section of the EA.

A Draft General Plan 2040 was released in August 2019. Following public input, the Planning Department issued a revised Draft General Plan 2045 in September 2023, and the Final Draft of the Hawai'i County General Plan 2045 was transmitted to the County Council for its review and decision-making in July 2024. The Leeward Planning Commission and Windward Planning Commission have finished reviewing the Draft General Plan 2045. This update of the General Plan incorporates emerging issues that were not addressed in the 2005 General Plan, such as climate change, healthy communities, integrated water resource management, renewable energy, food security, equitable housing and a place-based economy. Since the County of Hawai'i has not yet adopted this document, the 2005 General Plan is the current adopted policy of the county.

The following discussion evaluates the consistency of the proposed project with applicable objectives and policies of the current General Plan.

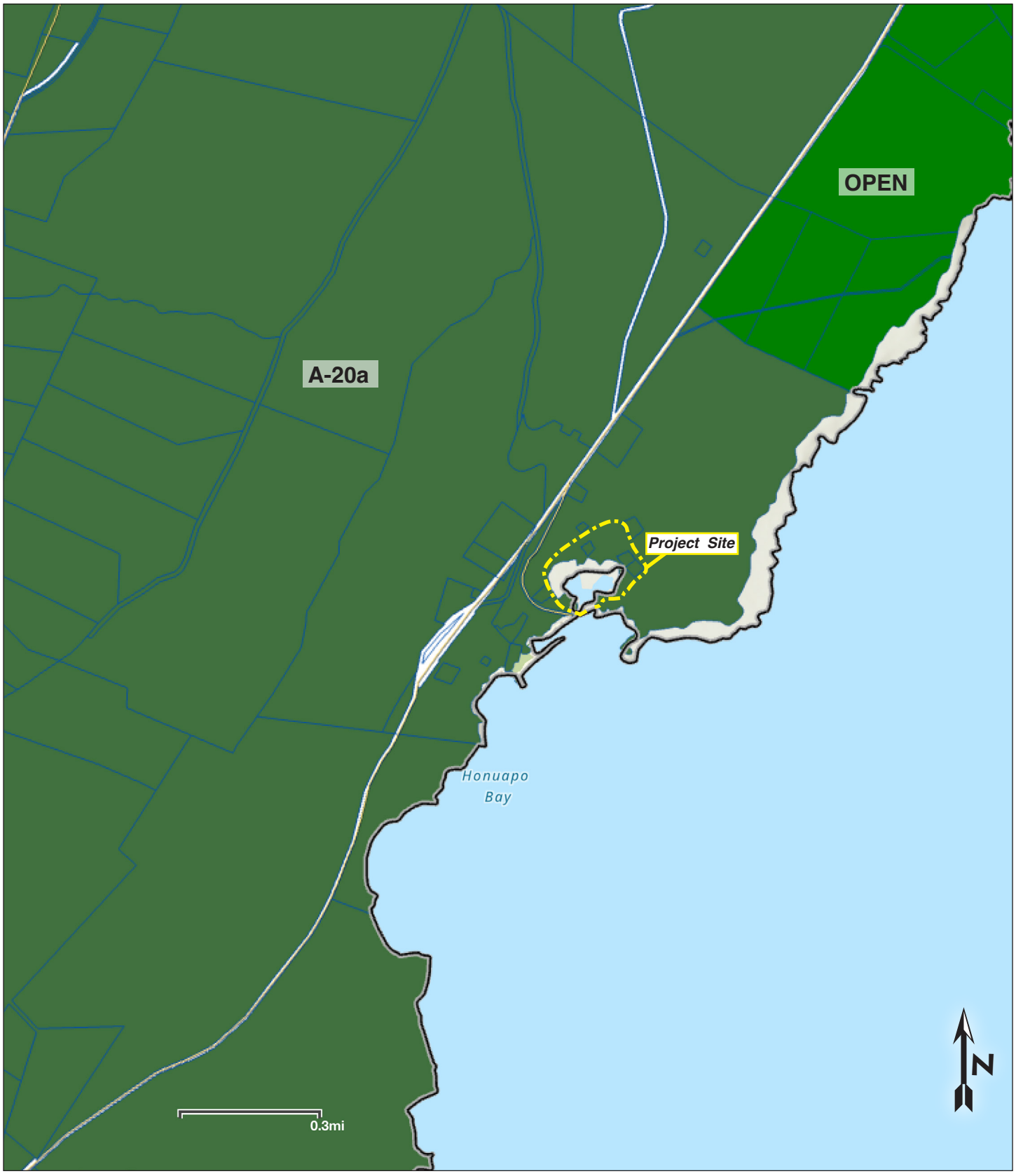
**Table 3. Consistency with Hawai'i County 2005 General Plan, Goals and Polices**

| Goal or Policy | Consistency | Discussion |
|---|---|---|
| *Flooding and Other Natural Hazards*<br>5.2 Goals<br>(a) Protect human life.<br>(b) Prevent damage to man-made improvements.<br>(c) Control pollution.<br>(d) Prevent damage from inundation.<br>(e) Reduce surface water and sediment runoff.<br>(f) Maximize soil and water conservation.<br>5.3 Policies<br>(d) Any development within the Federal Emergency Management Agency designated flood plain must be in compliance with Chapter 27.<br>(g) Development-generated runoff shall be disposed of in a manner acceptable to the Department of Public Works and in compliance with all state and federal laws.<br>(q) Consider natural hazards in all land use planning and permitting. | Yes | As described in Section 3.3, *Natural Hazards*, of this EA, the project site is located in the tsunami inundation zone. The shoreline areas are also subject to tsunami activity. The proposed improvements would be designed and constructed in conformance with the standards and requirements of the Hawai'i County Code, Chapter 27, *Floodplain Management*, as applicable. The proposed action includes site-specific BMPs to be implemented during construction in order to prevent any wastewater, sediment, soil, and debris resulting from the proposed construction from adversely impacting the coastal ecosystem. Compliance with BMPs for construction would minimize impacts to water quality. Further, all earthwork grading operations would be conducted in compliance with dust and erosion control requirements of Hawaii County Code Chapter 10, *Erosion and Sedimentation Control.* |
| *Historic Sites*<br>6.2 Goals<br>(a) Protect, restore, and enhance the sites, buildings, and objects of significant historical and cultural importance to Hawaii.<br>6.3 Policies | Yes | As set forth in Section 3.5, *Historic, Archaeological, and Cultural Resources*, an Archaeological Literature Review and Archaeological Site Preservation Plan was completed for the project site. The archaeological review identified one historic complex of eight features. |

| Goal or Policy | Consistency | Discussion |
|---|---|---|
| (c) Require both public and private developers of land to provide historical and archaeological surveys and cultural assessments, where appropriate, prior to the clearing or development of land when there are indications that the land under consideration has historical significance. | | Mitigation measures to preserve historic resources have been included in Section 3.6 above. |
| *Natural Beauty*<br>7.2 Goals<br>(a) Protect, preserve and enhance the quality of areas endowed with natural beauty, including the quality of coastal scenic resources.<br>h) Protect the views of areas endowed with natural beauty by carefully considering the effects of proposed construction during all land use reviews. | Yes | The Honu'apo area is identified as a "Natural Beauty Site" in the District of Ka'u (General Plan 2005 Table 7-14). The proposed project would improve the estuary wetland habitat for native birds. There would be no permanent changes to the natural beauty or views of the area with project implementation. |
| *Natural Resources and Shoreline*<br>8.2 Goals<br>(e) Protect and effectively manage Hawaii's open space, watersheds, shoreline, and natural areas.<br>(f) Ensure that alterations to existing land forms, vegetation, and construction of structures cause minimum adverse effect to water resources, and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of an earthquake.<br>8.3 Policies<br>(c) Maintain the shoreline for recreational, cultural, educational, and/or scientific uses in a manner that is protective of resources and is of the maximum benefit to the general public.<br>(r) Ensure public access is provided to the shoreline, public trails and hunting areas, including free public parking where appropriate. | Yes | The proposed project includes restoration of wetland habitat at an existing wetland feature. The proposed project improvements would improve water quality and habitat function. While a predator proof fence would be installed, public access would be provided via pedestrian gates and a walkway with viewing platforms. The proposed restoration project would provide increased opportunity for public eduation on coastal wetland ecosystems. Community participation in restoration and use as a loko i'a would continue with project implementation. |
| *Recreation*<br>12.2 Goals<br>(b) Maintain the natural beauty of recreation areas.<br>12.3 Policies<br>(b) Improve existing public facilities for optimum usage.<br>(h) Provide facilities and a broad recreational program for all age groups, with special considerations for the handicapped, the elderly, and young children. | Yes | See above. |

### County of Hawai'i Zoning Designation

The County of Hawai'i land use ordinance, or zoning code (Hawai'i County Code Chapter 25), regulates land use and overall future development on Hawai'i Island within the framework of the Hawai'i General Plan (Hawai'i County Code, Section 25-1-2(a)). The wetland and surrounding area is zoned as Agricultural District (A-20a) (20-ac minimum lot size) under the Hawai'i County Zoning Code (see Figure 14). The primary purpose of A (agricultural) district is to maintain open land, protect agricultural resources, and prevent urban encroachment on agricultural areas (Hawai'i County Code, Section 25-5-70). No feature of the proposed wetland improvements project would conflict with existing zoning.




*Honu'apo Estuary Wetland Restoration*

SOURCE: County of Hawai'i Geographic Information System Maps 2023

**Figure 14**

County of Hawai'i Zoning Designation

There are five Land Commission Award parcels (kuleana lands) and one school grant parcel within Honuʻapo lands, which are excluded from the park property. These kuleana parcels are located within or partially within the project site. The uses of the five awards were as follows:

- Hoolapa's award (LCAw. 9212:1) was for a 0.29-acre house lot;
- Kaulukoa's award (LCAw. 9564B) consisted of 0.44 acres that included a house lot and perhaps two salt beds;
- Lilikalani's award (LCAw. 9955B) included a portion of the fishpond at Honuʻapo and three salt cellars;
- Lepoloa's award (LCAw. 10008:2) of 0.3 acres appears to have been for 4 kihapai (wauke fields);
- Nahakuelua's award (LCAw.10516:1) was for a salt basin, and two house lots.

The kuleana parcels are shown on Figure 2 above. Access to kuleana parcels near the estuary would be maintained with implementation of the proposed wetland restoration project.

**Kaʻū Community Development Plan**

Community Development Plans (CDPs) translate broad goals, policies and standards from the Hawaiʻi County General Plan into implementation actions as they apply to specific geographical regions around Hawaiʻi Island. The CDPs serve as the forum for community input into establishing county policy at the regional level and coordinating the delivery of county services to the community. The CDPs direct physical development and public improvements and may contain detailed land use and zoning guide maps, plans for roadways, parks, other infrastructure and public facilities, planning for watersheds and natural resources, and any other land use matters relating to the planning area (Hawaiʻi County Planning Department 2023b). The Kaʻū CDP (October 2017) includes the areas of Pāhala, Punaluʻu, Nāʻālehu, Discovery Harbour, and Ocean View.

The Kaʻū CDP sets forth strategies that focus on protecting and enhancing the natural and cultural resources of Kaʻū, including coastal areas, agricultural land, mauka forests, scenic resources, ecosystems, historic and cultural features, and public access and trails. The CDP specifically identifies Policy 65, to "[a]ctively implement the Honuʻapo Park Resources Management Plan" (Hawaiʻi County 2017).

# 4 ALTERNATIVES TO THE PROPOSED ACTION

## 4.1 PROPOSED ALTERNATIVES

This chapter considers alternatives to the proposed action, including the No Action Alternative. The *Wetlands Habitat Restoration Plan for Honu'apo Estuary* (2011) considered four alternative plans for restoration. Full restoration under the proposed project is the desired alternative to meet all objectives of the Restoration Plan.

### *No Action Alternative*

The No Action Alternative identifies the expected environmental impacts in the future if existing conditions were left as is with no action taken by the approving agency. Under the No Action Alternative, restoration improvements to the wetland pond described in Section 2.2 would not occur. As a result, the present conditions within the project area would predominantly continue – stressors to biological habitat would not be remediated, which would likely result in the continued degradation of habitat for native plants and animals and continued predation on birds using the site. This alternative would not meet any of the identified project objectives.

### *Alternative 1: Proposed Project*

Under this alternative, the restoration improvements described in Section 2.2 would be implemented as the Proposed Project. This alternative includes actions to restore and enhance habitat form and structure and includes options for the control of avian predators. Under this alternative the full potential of the site would be realized. This alternative was developed so that components could be phased in over time as funding became available. Each phase would increase habitat productivity and result in incremental increases in habitat quality.

### *Alternative 2: Predator Control*

Under this alternative, the only action proposed is the control of avian predators. This alternative would result in continuation of the status quo with respect to physical and biological habitat components. Predator control, especially of feral cats and mongoose, needs to be conducted. At present it is believed that avian species using the wetland are subjected to constant predation, and the site maybe a biologic sink, meaning birds using it are preyed on, killed, resulting in their depletion from the larger region populations and genetic pool. As a standalone action, the control of predators would be significant in protecting avian species using the wetland habitat. Although an option, Alternative 2 is not recommended, since it would not result in full potential of the site and would likely not support large populations of avian species due to the degraded physical and biologic components of the habitat.

### *Alternative 3: Moderate Restoration*

This alternative includes actions to restore and enhance habitat form and structure, but does not include the control of avian predators. This alternative would enhance the physical and biological habitat components. However, without predator control, birds attracted to the site would be vulnerable to predation, creating a potential for an ecologic sink of avian species. This would be contrary to the objective of increasing resident and migratory bird populations.

# 5 FINDINGS AND DETERMINATION

As set forth in HAR Section 11-200.1-12, in considering the significance of potential environmental effects, an agency must "consider every phase of a proposed action, the expected consequences, both primary and secondary, and the cumulative as well as the short-term and long-term effects of the action." The proposed action is not expected to have a significant effect on the environment. The recommended preliminary determination for the Honu'apo Estuary Wetland Restoration project is a Finding of No Significant Impact (FONSI). The findings supporting this determination are discussed below.

**(1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.**

The project site at Honu'apo Estuary Wetland is a wetlands complex that has been altered by previous activities, resulting in sedimentation and invasion by non-native plants and animals. Wetland restoration and revegetation plans would restore the natural environment by removing non-native invasive vegetation and re-planting with native vegetation. The wetland was historically used as a fishpond, and archaeological remains of the fishpond are still present at the project site. Protective measures to ensure the preservation of the archaeological site complex detailed in the Archaeological Site Preservation Plan would ensure no impacts to archaeological sites would occur.

**(2) Curtails the range of beneficial uses of the environment.**

The proposed improvements would not curtail the range of beneficial uses at the project site. The project would increase the range of beneficial uses of the environment by increasing wetland habitat for use by endangered Hawaiian waterbirds and migratory shorebirds, and installation of predator proof fence to minimize predation on native bird species.

**(3) Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in HRS Chapter 344, and any revisions thereof and amendments thereto, court decisions, or executive orders.**

The proposed project is consistent with the environmental goals, policies, and guidelines established in HRS Chapter 344. The following guidelines (HRS Section 344-4) from the State Environmental Policy apply to the proposed project:

(2) Land, water, mineral, visual, air, and other natural resources.

(A) Encourage management practices which conserve and fully utilize all natural resources;
(D) Encourage management practices which conserve and protect watersheds and water sources, forest, and open space areas;

(3) Flora and fauna.

(A) Protect endangered species of indigenous plants and animals and introduce new plants or animals only upon assurance of negligible ecological hazard;
(B) Foster the planting of native as well as other trees, shrubs, and flowering plants compatible to the enhancement of our environment.

(4) Parks, recreation, and open space.

(A) Establish, preserve and maintain scenic, historic, cultural, park and recreation areas, including the shorelines, for public recreational, educational, and scientific uses;

(9) Education and culture.

(B) Encourage both formal and informal environmental education to all age groups.

The purpose of the project is to restore and enhance the Honu'apo wetland's form and function within the cultural context of the restoration of the traditional Hawaiian fishpond. Wetland restoration would provide a naturally functioning ecosystem with suitable habitat for endangered Hawaiian waterbirds. Removal of invasive plans and revegetation with native species would provide natural site conditions for native species. The project also includes ongoing predator control to protect the endangered endemic and migratory bird species visiting the wetland. The proposed restoration project would include pedestrian gates through the predator proof fence, in addition to walkways and viewing platforms, which would provide increased opportunity for public eduation on coastal wetland ecosystems.

**(4) Substantially affects the economic or social welfare of the community or state.**

The proposed action would have a short-term positive effect on the economic welfare of the island resulting from hiring construction workers. This project is not expected to significantly adversely affect traditional native Hawaiian cultural practices or other traditional cultural practices occurring in the surrounding area. Mitigation requiring archaeological preservation would minimize any impacts on identified historic resources. The proposed action would not have a substantial long-term effect on the economic and social welfare of the community or the state. The proposed project is in accordance with land use plans and regulations as set forth in Section 3.12, *Conformance with State and County Plans, Policies, and Land Use Controls.*

**(5) Substantially affects public health.**

The project would not substantially affect public health as discussed in various sections of this document. Construction activities may temporarily increase fugitive dust and noise levels in the project vicinity. Short-term construction-related effects would be minimized by complying with pertinent state or county regulations and conditions of permits required. Further, these impacts would cease upon completion of construction. No long-term negative impact on public health is anticipated with implementation of the proposed action.

**(6) Involves substantial secondary impacts, such as population changes or effects on public facilities.**

The proposed action would not generate population or create secondary demands and impacts on public facilities and services. Once completed, the project site may provide for educational viewing of wildlife resources.

**(7) Involves a substantial degradation of environmental quality.**

There would be no long-term, adverse environmental impacts associated with the proposed action. Construction activities may temporarily increase dust and noise in the project vicinity. However, these impacts would cease upon completion of construction. The proposed project will also include site-specific BMPs to minimize erosion and sedimentation effects to water quality. Additional mitigation measures included in Chapter 3 would minimize potential construction-related impacts. The proposed wetland restoration would have a beneficial effect on the environmental quality of Honuʻapo Estuary Wetland.

**(8) Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.**

Cumulative impacts are typically defined as the effects on the environment that result from the incremental impact of a project when added to past, present, and reasonably foreseeable future actions. The proposed Honuʻapo Estuary Wetland Restoration project should not have significant cumulative impacts on the surrounding environment; most of the effects of the wetland pond restoration are limited to the project site. The project would not require off-site infrastructure improvements, nor does it commit to larger actions. As discussed in the EA, the project would result in short-term construction effects. With implementation of BMPs and mitigation measures contained in this document, impacts would be considered less-than-significant. In a regional context, the project would not have cumulatively significant impacts.

**(9) Substantially affects a rare, threatened, or endangered species, or its habitat.**

The Honuʻapo wetland is vital to these endemic and migratory bird species, and given its estuarine nature, with a direct marine connection, acts as an important refuge for numerous endemic fish, threatened sea turtles, and the endangered Hawaiian monk seal. The proposed project would enhance and establish additional habitat for Hawaiian waterbirds. With implementation of mitigation and BMPs described in Section 3.4 of this document, no substantial adverse effects would occur to rare, threatened, or endangered species, or their habitats.

**(10) Detrimentally affects air or water quality or ambient noise levels.**

Construction activities would have a short-term effect on air quality, water quality, and ambient noise levels. Mitigation included in Chapter 3 would minimize these potential impacts. Construction activities would also be subject to applicable state and county regulations and permit conditions. No additional long-term impacts would occur.

**(11) Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.**

Wetland restoration activities would not result in increased flooding or hazards from flooding in surrounding areas. Portions of the project site are located within a flood plain, though wetland restoration activities would support the flood protection function of Honuʻapo Estuary Wetland. Prior to the initiation of construction, the County would review proposed grading and construction plans for consistency with county requirements and good

engineering practice, which would minimize damage during tropical storm, hurricane, or strong wind events, and earthquake events.

**(12) Substantially affects scenic vistas and viewplanes identified in county or state plans or studies.**

The proposed restoration of a wetland pond would improve the visual character of Honu'apo Estuary Wetland by increasing wetland habitat and removing invasive vegetation. The proposed improvements would not obstruct views from any recognized view corridor or scenic roadway.

**(13) Requires substantial energy consumption.**

There would be energy consumption associated with construction of the proposed project. The amount of energy that would be consumed with project implementation is not considered substantial.

# 6 INDIVIDUALS, COMMUNITY GROUPS, AND AGENCIES CONSULTED

## 6.1 EARLY CONSULTATION

Early consultation was conducted from April 2023 to June 2023, prior to preparation of the Draft EA for the proposed project. This is part of the scoping process for the Draft EA, and is intended to identify environmental issues and concerns to be addressed in the Draft EA. The following agencies, organizations, and individuals were sent a preliminary project description for comments or questions. *Those that provided written comments (either by hard copy or electronically) are highlighted in italics.* Copies of the written comments are included in Appendix A.

**FEDERAL AGENCIES**

*U.S. Fish and Wildlife Service*
Department of Army Corps of Engineers
Environmental Protection Agency
U.S. National Oceanic Atmospheric Administration, National Marine Fisheries Service

**STATE AGENCIES**

Department of Health, Environmental Health Administration
Department of Transportation
Department of Business, Economic Development and Tourism (DBEDT) – Office of Planning
*Office of Planning & Sustainable Development*
University of Hawai'i Water Resources Research Center
Office of Hawaiian Affairs
*Department of Hawaiian Home Lands*
*Department of Land and Natural Resources – Division of Aquatic Resources*
*Department of Land and Natural Resources – Engineering Division*
*Department of Land and Natural Resources – Office of Conservation and Coastal Lands*
Department of Land and Natural Resources - Historic Preservation Division

**COUNTY OF HAWAI'I**

Department of Environmental Management
Planning Department
Fire Department
Department of Parks and Recreation
*Police Department*
Department of Public Works
Department of Research and Development
*Department of Water Supply*

**ELECTED OFFICIALS**

County Council Representative Michelle Galimba

**COMMUNITY**

Hana Laulima Lahui o Kaʻu (Neighborhood Board)

Hawaiian Civic Club of Kaʻu (Neighborhood Board)

Ala Kahakai Trails Association (Neighborhood Board)

Na Mamo o Kāwā

Ka ʻOhana O Honuʻapo

O Kaʻū Kākou

**OTHER**

The Kaʻū Calendar (now ʻAlemanaka Kaʻū)

During preparation of the 2011 Restoration Plan, KOOH held a series of meetings with agency partners and community members to discuss the Restoration Plan and obtain their feedback. Additional gatherings were held following issuance of the Draft Restoration Plan, including a community presentation and informational meetings on the Plan. As part of the EA process, several meetings were held with community group Ka ʻOhana O Honuʻapo during review of the project to understand the evolution of the project and community context and knowledge.

## 6.2 ENVIRONMENTAL ASSESSMENT PREPARATION

This Draft Environmental Assessment (EA) was prepared for DLNR by Kahewai Environmental LLC, RJ Environmental Planning, and Bow Engineering & Development, Inc. The following consultants were involved in the preparation of this document:

William F. Bow, Principal Investigator / Kahewai Environmental LLC

Raadha M. B. Jacobstein, Lead Planner, RJ Environmental Planning

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DAR. See Hawai‘i, State of, Division of Aquatic Resources.

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DLNR. See Department of Land and Natural Resources, Division of State Parks.

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# APPENDIX A

Early Consultation Comment Letters

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# APPENDIX A

## EARLY CONSULTATION COMMENT LETTERS

Early consultation is considered an important part of the environmental review process – the goal is the gathering of information, data, and public concerns. A preliminary description of the project was circulated to agencies and individuals in April 2023, and phone consultations were conducted with permitting agencies as necessary. This Draft EA has incorporated additional information in response to early consultation comments.

Letters were received from the following agencies:

| | |
|---|---|
| **FEDERAL AGENCIES** | |
| U.S. Fish and Wildlife Service | undated |
| **STATE AGENCIES** | |
| Office of Planning & Sustainable Development | May 18, 2023 |
| Department of Hawaiian Home Lands | April 27, 2023 |
| Department of Land and Natural Resources – Division of Aquatic Resources | May 23, 2023 |
| Department of Land and Natural Resources – Engineering Division | May 16, 2023 |
| Department of Land and Natural Resources – Office of Conservation and Coastal Lands | May 23, 2023 |
| **COUNTY OF HAWAIʻI** | |
| Police Department | April 28, 2023 |
| Department of Water Supply | May 5, 2023 |

# United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawai'i 96850

Subject: IPaC generated official species list for the Pacific Islands Fish and Wildlife Office

Dear Action Agency or Applicant:

The Pacific Islands Fish and Wildlife Office (PIFWO) is transitioning to the Information for Planning and Consultation (IPaC) online portal, https://ipac.ecosphere.fws.gov/ for federal action agencies and non-federal agencies or individuals to obtain official species lists, including threatened and endangered species, designated critical habitat, and avoidance and minimization measures to consider in your general project design. IPaC has been used by continental USFWS offices to provide official species lists and avoidance and minimization guidance since 2017. Using IPaC expedites the process for species list distribution. Obtaining a species list in IPaC is relatively straightforward and takes minimal time to complete. Step by step instructions are included below.

Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of your species list should be verified after 90 days. New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change the species list. Verification can be completed by visiting the IPaC website at regular intervals during project planning and implementation. An updated list may be requested through the IPaC system by completing the same process used to obtain the initial species list.

We hope this process provides efficiencies to our partners in obtaining a species list. For federal action agencies, it also opens additional IPaC functionality that the PIFWO office is still working on, such as the use of Determination Keys for informal section 7 programmatic consultations. We will let our agency partners know when that functionality becomes available.

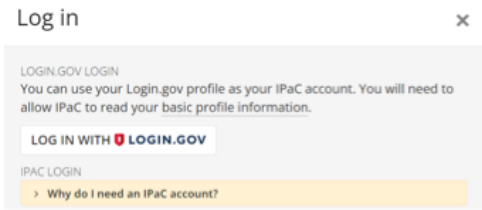
If you have questions about a species list obtained through the IPaC system or need assistance in completing an IPaC species list request, please contact the Service at 808-792-9400 or via email at pifwo_admin@fws.gov. We appreciate your efforts to conserve listed species across the Pacific Islands.

INTERIOR REGION 9
COLUMBIA-PACIFIC NORTHWEST
IDAHO, MONTANA*, OREGON*, WASHINGTON
*PARTIAL

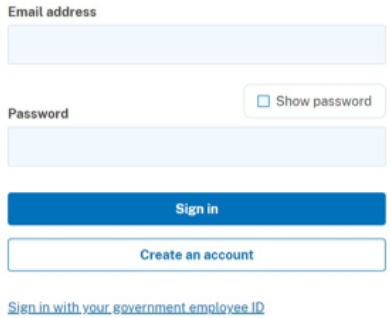
INTERIOR REGION 12
PACIFIC ISLANDS
AMERICAN SAMOA, GUAM, HAWAI'I, NORTHERN MARIANA ISLANDS

Instructions for Action Agencies and partners to obtain an official species list in IPaC

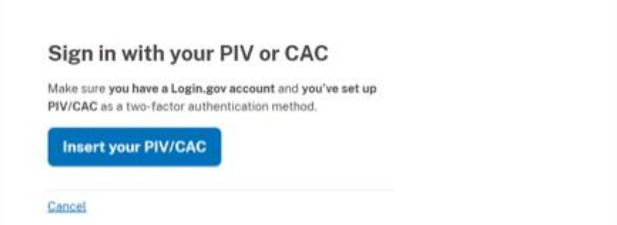
- Navigate to https://ipac.ecosphere.fws.gov/
- You can get an unofficial species list without logging in. However, if you want an official species list you will need to log in first using your Login.gov account. If you don't have an IPaC account, they are easy to create.




Select Log in with Login.gov and sign in using your email and password.

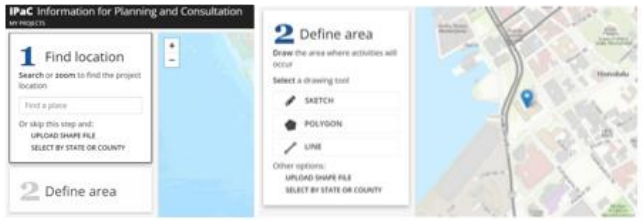



If you have a PIV or CAC card, you can sign in using that method as well.

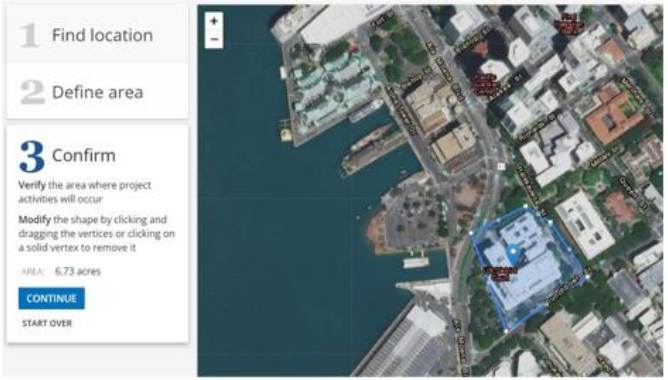



- Once you log in, select "Get Started".

- Define the action area: Identify the location of the proposed action by uploading an existing shapefile or by entering an address or coordinates of the action area. Once identified on the map, you can manually draw the action area using the drawing tools.

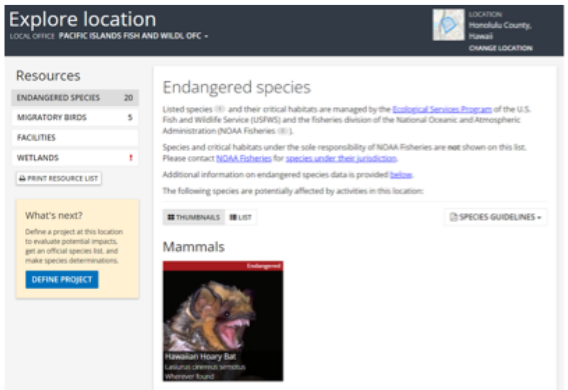


To help identify your action area you can choose between multiple base maps available.




Press continue when you have finished drawing or uploading the action area location.

- The species information on the page that follows is <u>not</u> official. However, it identifies the project County, local Fish and Wildlife Field Office, species covered under NOAA Fisheries as well as Migratory Bird Treaty Act species. The list can be viewed in Thumbnail or List format.
- Once the species list populates you will see images of the species that may occur on, near, or transgress across your project. Click on SPECIES GUIDELINES on your top right to see Avoidance and Minimization measures to incorporate into your General Project Design Guidelines.

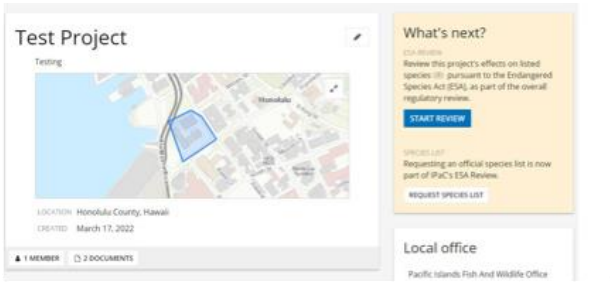



- Continue with the following steps to comply with the requirements of ESA section 7 to obtain an **official species list**.
- Select Define Project

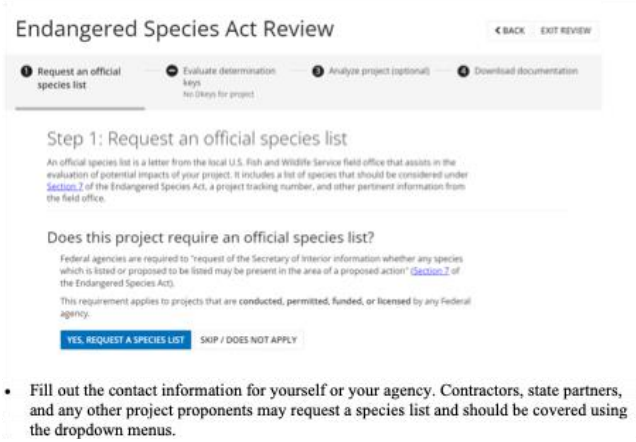
Enter the Project Name and a brief description of the project (a description is not mandatory, but recommended for future coordination with the Service). Click SAVE at bottom of page.

- At the bottom of the What's next box on the right, click Request Species List

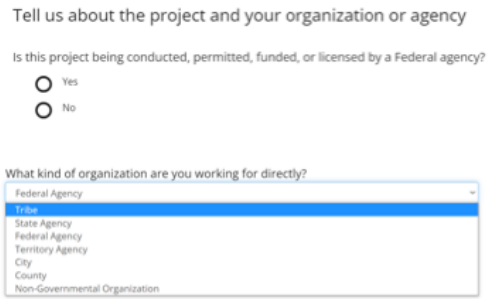




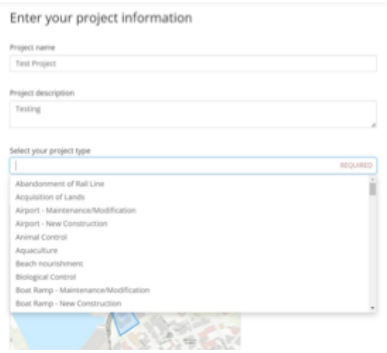

- on the following screen, click Yes, Request Species List




- Fill out the contact information for yourself or your agency. Contractors, state partners, and any other project proponents may request a species list and should be covered using the dropdown menus.




- From the pull-down menu for Classify Type of Project, select the project type that best fits the proposed action.




- Once all required sections are filled out, press SUBMIT OFFICIAL SPECIES LIST REQUEST

- An Official Species List should be generated and available for download in a couple of seconds.
- If you need additional information on a species, click on their name that is hot-linked to their species information page. A brief overview of the species' status, description and critical habitat will appear as well as a link to their ECOS species profile.

**STATE OF HAWAI'I**
**OFFICE OF PLANNING**
**& SUSTAINABLE DEVELOPMENT**

235 South Beretania Street, 6th Floor, Honolulu, Hawai'i 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawai'i 96804

JOSH GREEN, M.D.
GOVERNOR

MARY ALICE EVANS
ACTING DIRECTOR

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: https://planning.hawaii.gov/

Coastal Zone Management Program
Environmental Review Program
Land Use Commission
Land Use Division
Special Plans Branch
State Transit-Oriented Development
Statewide Geographic Information System
Statewide Sustainability Branch

DTS 202304251627NA

May 18, 2023

MEMORANDUM

TO: David Smith, Branch Chief
Division of Forestry and Wildlife
Department of Land and Natural Resources

FROM: Mary Alice Evans, Acting Director MaryAlice Evans

SUBJECT: Honu'apo Estuary Wetland Restoration Project, Island of Hawai'i, Hawaii Scoping and Early Consultation, Honu'apo Park, Ka'ū District, Southern Hawai'i Island; Tax Map Key: (3) 9-5-014: Portion of 007

Thank you for the opportunity to provide early comments on the Honu'apo Estuary Wetland Restoration Project at the Honu'apo Park, Ka'ū District, Southern Hawai'i Island, via memorandum, received April 25, 2023.

According to the request for early consultation for the preparation of an Environmental Assessment (EA), the State of Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife proposes to restore the existing approximately 8-acre Honu'apo Estuary Wetland pond in the Ka'ū District. The proposed project is located within the State Conservation District and Agricultural District, and within the County designated Special Management Area (SMA) under Hawaii Revised Statutes (HRS) Chapter 205A. Use of State lands and State funds are the triggers for the requirement of an EA pursuant to HRS Chapter 343.

The proposed wetland restoration project, which is based on the Wetland Habitat Restoration Plan for Honu'apo Estuary, includes the following improvements:

- removal of invasive vegetation to improve water quality and quantity as well as habitat function
- creation of deepened water areas by grading for improved habitat productivity and diversity
- revegetation with native plant species to provide natural site conditions for native endemic species
- installation of a predator proof fence
- pedestrian gate and walkway with viewing platforms



The grading from the proposed project would include approximately 9,270 cubic yards of cut and 0.5 cubic yards of fill over a 2.23-acre area of the estuary.

The estimated construction costs for completion of the wetland restoration project are approximately $1.5 million. The project would be phased based on funding availability.

The Office of Planning and Sustainable Development (OPSD) has reviewed the subject early EA consultation request, and has the following comments to offer:

1. The Hawaii Coastal Zone Management (CZM) Law, HRS Chapter 205A, requires all state and county agencies to enforce the CZM objectives and policies. The subject EA should include an assessment with mitigation measures, if needed, as to how the proposed wetland restoration project conforms to each of the CZM objectives and supporting policies set forth in HRS Chapter 205A-2, as amended.

2. The OPSD recommends that the EA specifically discuss the compliance with the requirements of SMA use under County of Hawaii SMA Rules, as amended, for the proposed wetland restoration project by consulting with the County of Hawaii Department of Planning.

3. If the proposed action disturbs one acre or more of land, or involves dewatering discharge activities, the applicant should consult with the Clean Water Branch, State of Hawaii Department of Health, for the requirement of a National Pollutant Discharge Elimination System (NPDES) Permit for the associated construction activities.

4. The OPSD recommends that site-specific erosion control measures shall be implemented to prevent any runoff, sediment, soil and debris potentially resulting from the proposed construction activities, including grading, filling and staging, from adversely impacting the coastal ecosystem and the State waters as specified in Hawaii Administrative Rules Chapter 11-54.

5. Pursuant to Code of Federal Regulations (CFR), 15 CFR 930, if a federal permit or approval, such as an Army Corps of Engineers Permit, is required for the proposed wetland restoration project, a federal consistency review may be required from the OPSD, the Hawaii CZM Program. Please consult with our office on the policies and procedures applicable to CZMA federal consistency reviews, if it is deemed that this proposed action requires federal permitting.

If you have any questions regarding this comment letter, please contact Shichao Li of our office at (808) 587-2841 or by email at shichao.li@hawaii.gov or Debra Mendes at (808) 587-2840 or Debra.L.Mendes@hawaii.gov on CZMA federal consistency matters.

JOSH GREEN, M.D.
GOVERNOR
STATE OF HAWAI'I

SYLVIA J. LUKE
LT. GOVERNOR
STATE OF HAWAI'I

KALI WATSON
CHAIRMAN, HHC

KATIE L. DUCATT
DEPUTY TO THE CHAIRMAN

**STATE OF HAWAII**
**DEPARTMENT OF HAWAIIAN HOME LANDS**
*Ka 'Oihana 'Āina Ho'opulapula Hawai'i*
P. O. BOX 1879
HONOLULU, HAWAII 96805

April 27, 2023

Refer: PO-23-076

sent electronically to: wbow@bowengineering.com
William Bow
Bow Engineering & Development, Inc.
1953 So. Beretania St., PH-A
Honolulu, HI 96826

Aloha:

Subject: Honu'apo Estuary Wetland Restoration Project, Island of Hawaii
Hawaii Scoping and Early Consultation

The Department of Hawaiian Home Lands acknowledges receiving the request for comments on the above-cited project. After reviewing the materials submitted, due to its lack of proximity to Hawaiian Home Lands, we do not anticipate any impacts to our lands or beneficiaries from the project. However, DHHL recommends consultation with Hawaiian Homestead community associations located within the moku of Puna, district of Ka'u and with other (N)native Hawaiian organizations, to better assess potential impacts to cultural and natural resources, and other rights of Native Hawaiians. A list of DHHL homestead associations can be found at https://dhhl.hawaii.gov/homestead-associations/

Mahalo for the opportunity to provide comments. If you have any questions, please call the Planning Office, at (808) 620-9480 or contact via email at dhhl.planning@hawaii.gov.

Aloha,

Andrew H. Choy
Planning Program Manager

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JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA

DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

**STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**
**KA 'OIHANA KUMUWAIWAI 'ĀINA**
**LAND DIVISION**

P.O. BOX 621
HONOLULU, HAWAII 96809

May 24, 2023

Bow Engineering & Development, Inc.
Attn: Mr. William Bow
1953 S. Beretania Street, PH-A
Honolulu, Hawaii 96826

via email: wbow@bowengineering.com

Dear Mr. Bow:

SUBJECT: Scoping and Early Consultation for an Environmental Assessment for the Proposed **Honu'apo Estuary Wetland Restoration Project** located at Honu'apo Park, Ka'u District, Island of Hawaii; TMK: (3) 9-5-014:007 on behalf of the Division of Forestry and Wildlife

Thank you for the opportunity to review and comment on the subject matter. The Land Division of the Department of Land and Natural Resources (DLNR) distributed or made available a copy of your request pertaining to the subject matter to DLNR's Divisions for their review and comments.

At this time, enclosed are comments from the (a) Division of Aquatic Resources, (b) Engineering Division, and (c) Land Division-Hawaii District on the subject matter. Should you have any questions, please feel free to contact Darlene Nakamura at (808) 587-0417 or email: darlene.k.nakamura@hawaii.gov. Thank you.

Sincerely,

*Russell Tsuji*

Russell Y. Tsuji
Land Administrator

Enclosures
cc: Central Files

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JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA

DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

**STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**
**KA 'OIHANA KUMUWAIWAI 'ĀINA**
**LAND DIVISION**

P.O. BOX 621
HONOLULU, HAWAII 96809

April 26, 2023

**MEMORANDUM**

TO: **DLNR Agencies:**
X Div. of Aquatic Resources (glenn.r.higashi@hawaii.gov)
__Div. of Boating & Ocean Recreation
X Engineering Division (DLNR.ENGR@hawaii.gov)
__Div. of Forestry & Wildlife
__Div. of State Parks
X Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
X Office of Conservation & Coastal Lands (sharleen.k.kuba@hawaii.gov)
X Land Division – Hawaii District (gordon.c.heit@hawaii.gov)
__Aha Moku Advisory Committee

FROM: Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: Scoping and Early Consultation for an Environmental Assessment for the Proposed **Honu'apo Estuary Wetland Restoration Project**
LOCATION: Honu'apo Park, Ka'u District, Island of Hawaii; TMK: (3) 9-5-014:007
APPLICANT: Department of Land and Natural Resources, Division of Forestry and Wildlife

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by **May 24, 2023.**

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

**BRIEF COMMENTS:**

( ) We have no objections.
( ) We have no comments.
( ) We have no additional comments.
(☑) Comments are included/attached.

Signed: *[signature]*
Print Name: Brian Neilson
Division: State of Hawaii
Date: May 23, 2023

Attachments
cc: Central Files

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA

DAWN N.S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
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LAURA H.E. KAAKUA
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AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

**STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I**
**DEPARTMENT OF LAND AND NATURAL RESOURCES DIVISION OF AQUATIC RESOURCES**
1151 PUNCHBOWL STREET, ROOM 330
HONOLULU, HAWAII 96813
Date: 05/23/23
DAR # AR6398

MEMORANDUM
TO: Brian J. Neilson
DAR Administrator

FROM: Troy Sakihara *TSS*, Aquatic Biologist

SUBJECT: Early Consultation for an Environmental Assessment for the proposed Honu'apo Estuary Wetland Restoration Project

Request Submitted by: Russell Y. Tsuji, Land Administrator
Location of Project: Honu'apo Park, Ka'ū District, Hawai'i Island; TMK: (3) 9-5-014:007

Brief Description of Project:
The DLNR Division of Forestry and Wildlife is proposing a restoration project within Honu'apo Park, including County of Hawai'i Whittington Beach Park, in Ka'ū to rehabilitate an existing estuarine and marsh habitat approximately 8 acres in area. The location of the project is within the State Conservation District and Agriculture District. The project area consists of a wetland complex comprised of subtidal, intertidal and palustrine wetland types, the latter of which is mostly covered by dense non-native plants. No surface flowing freshwater streams are located in the area. However, there is measurable groundwater discharging within the estuary and wetland habitat.

Comments:
☐ No Comments ☒ Comments Attached

Thank you for providing DAR the opportunity to review and comment on the proposed project. Should there be any changes to the project plan, DAR requests the opportunity to review and comment on those changes.

Comments Approved: *[signature]* Date: May 23, 2023
Brian J. Neilson
DAR Administrator

DAR# AR6398

Brief Description of Project

The main activities of the proposed project include the removal of invasive vegetation to improve water circulation, water quality and habitat function, create deepened water areas to improve habitat for native plants and animals, out-planting of native species to provide natural conditions for native species, installation of a predator-proof fence, and construction of a pedestrian gate and walkway with viewing platforms. These objectives are based on the Wetlands Habitat Restoration Plan for Honu'apo Estuary.

Based on the conceptual plan, two habitat types are to be created and enhanced by modifications made to the topography in the intertidal zone. This includes 9,270 cubic yards that are to be cut and 0.5 cubic yards filled over 2.23 acres in the estuary. This is intended to result in frequent inundation over mudflat areas across diurnal tidal cycles to improve foraging and grazing areas for native birds. Further, these actions should mitigate the recruitment and re-establishment of invasive vegetation in these areas. Grading is also expected to create deeper water pools that are to be perennial, creating more brackish water habitat for native estuarine species and native water fowl.

The primary objective of the project is to rehabilitate the estuarine and wetland habitat to improve and restore natural function of said habitat for native plants and animals, particularly migratory bird species. The project also aims to enhance aquatic habitat for native fish, turtles and other native aquatic flora and fauna, while considering estimated sea level rise. In addition, educational and recreational use of the area are to be improved, and cultural and historical values of the area are to be preserved through this project.

Various Federal, State and County permits may be required for this project.

DAR# AR6398

Comments

In 2007, the DAR conducted a series of estuary cast net samples in the Honu'apo estuary as part of a broader statewide estuarine habitat characterization project. A total of 21 fish and invertebrate species were recorded, consisting of a mix of native and non-native invasive species. However, the relative abundance of invasive species comprised 79% of all samples with poeciliids (topminnows) being the dominant species (67%). Invasive Kanda, Osteomugil engeli, and non-native snails Melanoides tuberculata, were also common and consistently recorded. The most abundant native species was 'ōpae huna, Palaemon debilis. All estuarine species that were recorded in the Honu'apo estuary are not uncommon in Hawaiian estuarine or brackish habitats. Further, the dominance of invasive estuarine species is consistent with species compositions in other impacted estuaries surveyed by DAR. Benthic composition within the estuary consisted almost entirely of sediment and boulder.

Estuarine habitats dominated by non-native and invasive vegetation, or those that have been significantly altered from natural conditions, have shown to support non-native estuarine species at other estuarine sites. In contrast, native and naturally functioning estuaries with unimpeded or unaffected freshwater/saltwater connection, circulation, flow and water quality facilitate the recruitment and survival of native species. Accordingly, despite the Honu'apo estuarine species composition being described from 2007 by DAR, it is unlikely the species composition has significantly changed since then given the persistent dominance of invasive vegetation in and around the area. However, the DAR anticipates a measurable improvement in estuarine habitat conditions from the proposed project, and over time, expect increases in relative abundance and composition of native estuarine species as a result. This aligns with one of DAR's goals to improve and restore aquatic habitats and ecosystems to naturally thriving conditions.

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA

DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'ĀINA
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

April 26, 2023

**MEMORANDUM**

FROM: ~~TO:~~ **DLNR Agencies:**
X Div. of Aquatic Resources (glenn.r.higashi@hawaii.gov)
__Div. of Boating & Ocean Recreation
X Engineering Division (DLNR.ENGR@hawaii.gov)
__Div. of Forestry & Wildlife
__Div. of State Parks
X Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
X Office of Conservation & Coastal Lands (sharleen.k.kuba@hawaii.gov)
X Land Division – Hawaii District (gordon.c.heit@hawaii.gov)
__Aha Moku Advisory Committee

TO: ~~FROM:~~ Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: Scoping and Early Consultation for an Environmental Assessment for the Proposed **Honu'apo Estuary Wetland Restoration Project**
LOCATION: Honu'apo Park, Ka'u District, Island of Hawaii; TMK: (3) 9-5-014:007
APPLICANT: Department of Land and Natural Resources, Division of Forestry and Wildlife

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by **May 24, 2023.**

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

**BRIEF COMMENTS:**

( ) We have no objections.
( ) We have no comments.
( ) We have no additional comments.
( ✓ ) Comments are included/attached.

Signed: *CSC*
Print Name: Carty S. Chang, Chief Engineer
Division: Engineering Division
Date: May 16, 2023

Attachments
cc: Central Files

**DEPARTMENT OF LAND AND NATURAL RESOURCES**
**ENGINEERING DIVISION**

**LD/Russell Y. Tsuji**
**Ref: Scoping and Early Consultation for an Environmental Assessment for the Proposed Honu'apo Estuary Wetland Restoration Project**
**Location: Honu'apo Park, Ka'u District, Island of Hawaii**
**TMK(s): (3) 9-5-014:007**
**Applicant: Department of Land and Natural Resources, Division of Forestry and Wildlife**

**COMMENTS**

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high-risk areas). State projects are required to comply with 44CFR regulations as stipulated in Section 60.12. Be advised that 44CFR, Chapter 1, Subchapter B, part 60 reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood Hazard Zones are designated on FEMA's Flood Insurance Rate Maps (FIRM). The official FIRMs can be accessed through FEMA's Map Service Center (msc.fema.gov). Our Flood Hazard Assessment Tool (FHAT) (http://gis.hawaiinfip.org/FHAT) could also be used to research flood hazard information.

If there are questions regarding the local flood ordinances, please contact the applicable County NFIP coordinating agency below:

- Oahu: City and County of Honolulu, Department of Planning and Permitting (808) 768-8098.
- Hawaii Island: County of Hawaii, Department of Public Works (808) 961-8327.
- Maui/Molokai/Lanai County of Maui, Department of Planning (808) 270-7139.
- Kauai: County of Kauai, Department of Public Works (808) 241-4896.

Signed: *CSC*
CARTY S. CHANG, CHIEF ENGINEER

Date: May 16, 2023

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA

STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'ĀINA
Office of Conservation and Coastal Lands
P.O. BOX 621
HONOLULU, HAWAII 96809

DAWN N.S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

LAURA H.E. KAAKUA
FIRST DEPUTY

W. KALEO MANUEL
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CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

REF: OCCL: TF

COR: HA 23-178

May 23, 2023

William Bow
Bow Engineering & Development, Inc.
1953 South Beretania Street, PH-A
Honolulu, HI 96826

SUBJECT: Scoping and Early Consultation for an Environmental Assessment for the Proposed Honuapo Estuary Wetland Restoration Project
Located at Honuapo Park
Por. of Hionaa - Honuapo, Kau, Island of Hawaii
Tax Map Key (TMK): (3) 9-5-014:007

Dear William Bow:

The Office of Conservation and Coastal Lands (OCCL) has reviewed the Division of Forestry and Wildlife's (DOFAW) memo and attachments regarding the subject matter. According to the memo, DOFAW is proposing to rehabilitate ±8-acres of Honuapu Estuary Wetland Pond at the Honuapo Park. The memo states that the subject parcel is owned by the State of Hawaii and managed by the County of Hawaii Department of Parks and Recreation as part of the Honuapo Park along with Ka Ohana O Honuapo, a non-profit community group. The memo notes that the proposed wetland restoration project improvements are based on the County of Hawaii's 2011 conceptual restoration plan *Wetlands Habitat Restoration Plan for Honuapo Estuary* and includes the following proposed work:

- Removal of invasive vegetation to improve water quality and quantity as well as habitat function
- Creation of deepened water areas for improved habitat productivity and diversity
- Revegetation with native plants species to provide natural site conditions for native endemic species
- Installation of a predator proof fence
- Pedestrian gate and walkway with viewing platforms

The memo states that the creation of deepened water areas will involve the altering of the topography of the intertidal zone by grading. The proposed grading would include approximately 9,270 cubic yards of cut and 0.5 yards of fill over a 2.23-acre area of the estuary/pond. The ground surface in these areas would be lowered to finished elevations that will result in frequent inundation by high tides. Forage habitat would also be created on the mudflat areas that are currently covered with ground cover. The memo notes that these proposed modifications are expected to increase productivity of food sources used by





wading birds such as the Hawaiian coot and other diving and dabbling birds and help prevent recruitment of invasive plants back onto the mudflats.

A Draft Environmental Assessment (DEA) is being prepared for the proposed Honuapo Estuary Wetland Restoration Project pursuant to Hawaii Revised Statutes (HRS) Chapter 343 to comply with state environmental laws and regulations. On behalf of DOFAW, you are requesting comments on the proposed project in advance of preparing its DEA.

The OCCL regulates land uses in the State Land Use Conservation District through the issuance of Conservation District Use Permits and Site Plan Approvals to help conserve, protect, and preserve important natural and cultural resources. In this particular area, it appears that the approximate State Land Use Agricultural/Conservation District boundary follows the fishpond as it existed in 1969 and is subject to a valid certified shoreline according to Land Use Commission (LUC) Boundary Interpretation (BI) HA 00-44. A cursory review of the Department of Accounting and General Services (DAGS) Land Survey's website and certified shoreline maps (https://ags.hawaii.gov/survey/certified-shoreline-maps/ ) appears to indicate that the shoreline in this area was certified on February 18, 2005, and follows along in some sections the debris line; top of pond bank; and along the highwater mark as evidenced by the edge of vegetation and/or edge of sand as located on July, 6, 2004. The 2005 certified shoreline places the fishpond at Honuapo on submerged lands owned by the State of Hawaii. Based on the above, the OCCL notes that it appears portions of the subject parcel and project area lie in the Resource Subzone of the State Land Use Conservation District.

DOFAW may want to consider consulting with the LUC ((808) 587-3822) regarding the need to obtain a certified shoreline and more accurate BI. A more precise BI may help establish jurisdictional authority for the proposed project area.

According to OCCL files, staff provided DOFAW via an email, noted as COR: HA 15-105, a summary of potential Conservation District authorization processes for the proposed Wetlands Habitat Restoration Plan for Honuapo Estuary on December 18, 2014. It was noted that the project could be applied for through either the Loko Ia (fishpond) application or a Conservation District Use Application (CDUA). The correspondence stated that both potential applications processes would appear to require consultation with the LUC to determine the boundaries of the Conservation District and Land Division regarding the need for a land disposition.

On July 26, 2019, the OCCL approved Loko Ia permit HA: 19-02 under the state-wide Hoala Loko Ia Conservation District Use Permit (CDUP) ST-3703 for restoration work on the fishpond at Honuapo by the non-profit hui of Ka Ohana O Honuapo. Approved restoration work included the manual removal of sediment and vegetation overgrowth, the planting of native plant species, water quality monitoring, the repair and reconstruction of the kuapa (seawall(s)), and the manual removal of invasive fish species with nets.

Additionally, correspondence letter CORR: HA 19-197 was sent to Engineering Division (ENG) regarding ENG's memo and request for advice on Conservation District permitting requirements regarding DOFAW's proposed Honuapo Estuary Wetland Restoration project on July 26, 2019. The response stated that the creation or "sculpting of deepened water areas" in the fishpond at Honuapo would trigger the need for a Conservation District Use Permit from the Board of Land and Natural Resources (BLNR) pursuant to Hawaii Administrative Rules (HAR) §13-5-24 R-5 MARINE CONSTRUCTION (D-1) *Dredging, filling, or construction on submerged lands, including construction of harbors, piers, marinas, and artificial reefs*. The letter noted that the local community group Ka Ohana O Honuapo had recently secured a permit through the Hoala Loko Ia program for restoration work on the pond which included the manual restoration of the kuapa (interior pond walls), manual removal of invasive vegetation and planting of native species, and the manual removal of sediment. The possibility of DOFAW to consider working with Ka

REF: OCCL: TF COR: HA 23-178

Ohana O Honuapo regarding DOFAW's Honuapo Estuary Wetland Restoration project and associated work was also put forward in OCCL's response to ENG's memo.

Based on this history outlined above and the information you have provided, OCCL stands by our previous application guidance regarding DOFAW's proposed Honuapo Estuary Wetland Restoration Project. It appears that some of the proposed work is consistent with work that was approved by the existing Loko Ia permit HA: 19-02 while the proposed predator proof fence, pedestrian gate, walkway with viewing platforms, and grading/creation of deepened water areas within the pond on submerged lands will require additional information, review, and potentially authorization from the Department or BLNR. The current rules and regulations of the Conservation District, noted as Hawaii Administrative Rules (HAR) Chapter 13-5, as well as proposed amendments can be found at https://dlnr.hawaii.gov/occl/rules/ .

Applications for proposed land uses require the signature of the landowner(s). It appears DOFAW may want to consider consulting with Land Division regarding the creation of deepened water areas on State submerged lands and the need for a land disposition and/or lease for DOFAW, the County of Hawaii, and Ka Ohana O Honuapo to co-manage the fishpond area.

The OCCL requests that DEA discuss fishpond restoration at Honuapo and its compatibility with DOFAW's proposed Honuapo Estuary Wetland Restoration Project. Additionally, there is the appearance that there may be the potential for conflict between existing and proposed users and uses at the site. It also appears that traditional and cultural practices may be conducted in the area. The DEA should contain a section discussing the proposed project's potential impacts to the existing users and uses of the area and potential mitigation measures that shall be implemented.

The letter notes that one of the secondary objectives of the Honuapo Estuary Wetland Restoration Project is to accommodate sea level rise. The DEA should contain projections for sea level rise in relation to the project area and describe how lateral access along the shoreline will be maintained.

Should you have any questions, feel free to contact Trevor Fitzpatrick of the Office of Conservation and Coastal Lands at (808) 798-6660 or trevor.j.fitzpatrick@hawaii.gov .

Sincerely,

(for)
Michael Cain, Administrator
Office of Conservation and Coastal Lands

CC: *Hawaii Division Land Office*
*Land Use Commission*
*County of Hawaii Planning Department*

3

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Mitchell D. Roth
*Mayor*

Benjamin T. Moszkowicz
*Police Chief*

**County of Hawai`i**
**POLICE DEPARTMENT**
349 Kapi'olani Street • Hilo, Hawai'i 96720-3998
(808) 935-3311 • Fax (808) 961-2389

April 28, 2023

Mr. David Smith
Branch Chief
Department of Land and Natural Resources
Division of Forestry and Wildlife
1151 Punchbowl Street, Room 325
Honolulu, HI 96813

Dear Mr. Smith:

SUBJECT: HONU'APO ESTUARY WETLAND RESTORATION PROJECT, ISLAND OF HAWAII, HAWAII SCOPING AND EARLY CONSULTATION

This is in response to your memorandum regarding the Honu'apo Estuary Wetland restoration project. The preliminary project description and figures have been reviewed and we offer no comments at this time.

Should you have questions, please contact Captain Akira Edmoundson, Commander of the Ka'u District, at (808) 939-2520, or via email at akira.edmoundson@hawaiicounty.gov.

Sincerely,

BENJAMIN T. MOSZKOWICZ
POLICE CHIEF

CHAD BASQUE
ASSISTANT POLICE CHIEF
AREA II OPERATIONS

AE/jaj
23HQ0545

"Hawai'i County is an Equal Opportunity Provider and Employer"

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**DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAI'I**
345 KEKŪANAŌ'A STREET, SUITE 20 • HILO, HAWAI'I 96720
TELEPHONE (808) 961-8050 • FAX (808) 961-8657

May 5, 2023

Mr. William Bow
Bow Engineering and Development, Inc.
1953 South Beretania Street, PH-A
Honolulu, HI 96826

Dear Mr. Bow:

**Subject: Pre-Environmental Assessment Consultation for**
**Honu'apo Estuary Wetland Restoration Project**
**Tax Map Key (3) 9-5-014:007**

We have reviewed your Pre-Environmental Assessment Consultation letter, dated April 25, 2023.

We have no comments or objections as there are no Department of Water Supply facilities in the area.

Should there be any questions, please contact Mr. Ryan Quitoriano of our Water Resources and Planning Branch at (808) 961-8070, extension 256.

Sincerely yours,

Keith K. Okamoto, P.E.
Manager-Chief Engineer

RQ:dfg

copy – State of Hawai'i , Department of Land and Natural Resources,
Division of Forestry and Wildlife

*. . . Water, Our Most Precious Resource . . . Ka Wai A Kāne . . .*
The Department of Water Supply is an Equal Opportunity provider and employer.

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# APPENDIX B

Grading and Construction Plans

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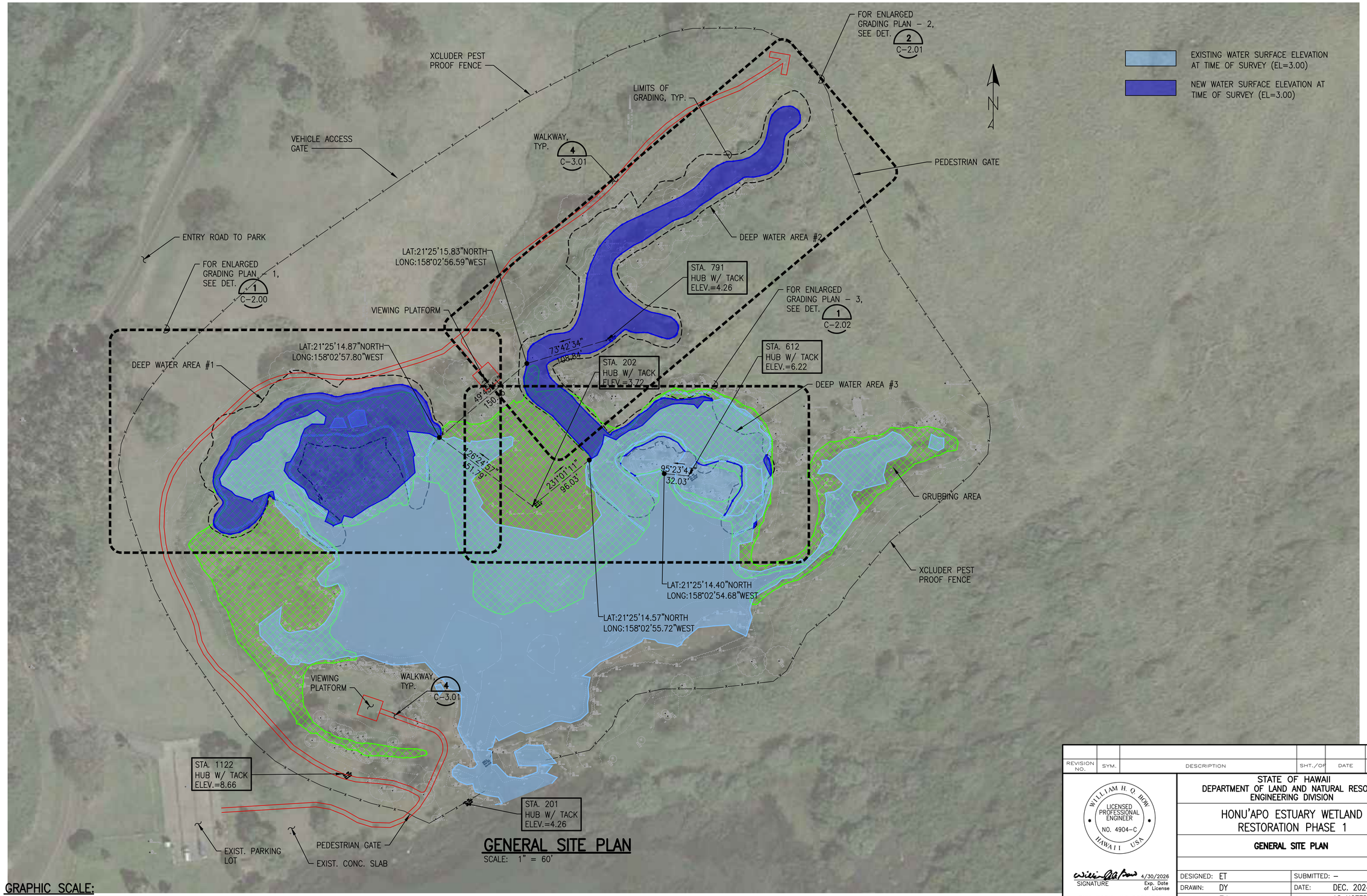


## GENERAL SITE PLAN

SCALE: 1" = 60'

GRAPHIC SCALE:

60 30 0 60 120

1" = 60'

| REVISION NO. | SYM. | DESCRIPTION | SHT./OF | DATE | APPROVED |
|---|---|---|---|---|---|

WILLIAM H. Q. BOW
LICENSED PROFESSIONAL ENGINEER
NO. 4904–C
HAWAII USA

SIGNATURE 4/30/2026 Exp. Date of License

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

HONU'APO ESTUARY WETLAND RESTORATION PHASE 1

GENERAL SITE PLAN

| | |
|---|---|
| DESIGNED: ET | SUBMITTED: – |
| DRAWN: DY | DATE: DEC. 2024 |
| CHECKED: EY | SCALE: AS NOTED |

APPROVED: _____ DATE _____
CHIEF ENGINEER

DRAWING NO. C–1.00

JOB NO. D00PH60A SHEET NO. 3 OF 12 SHEETS

Plotted: Tue, 10 Dec 2024 – 12:05pm By: ETANITOM
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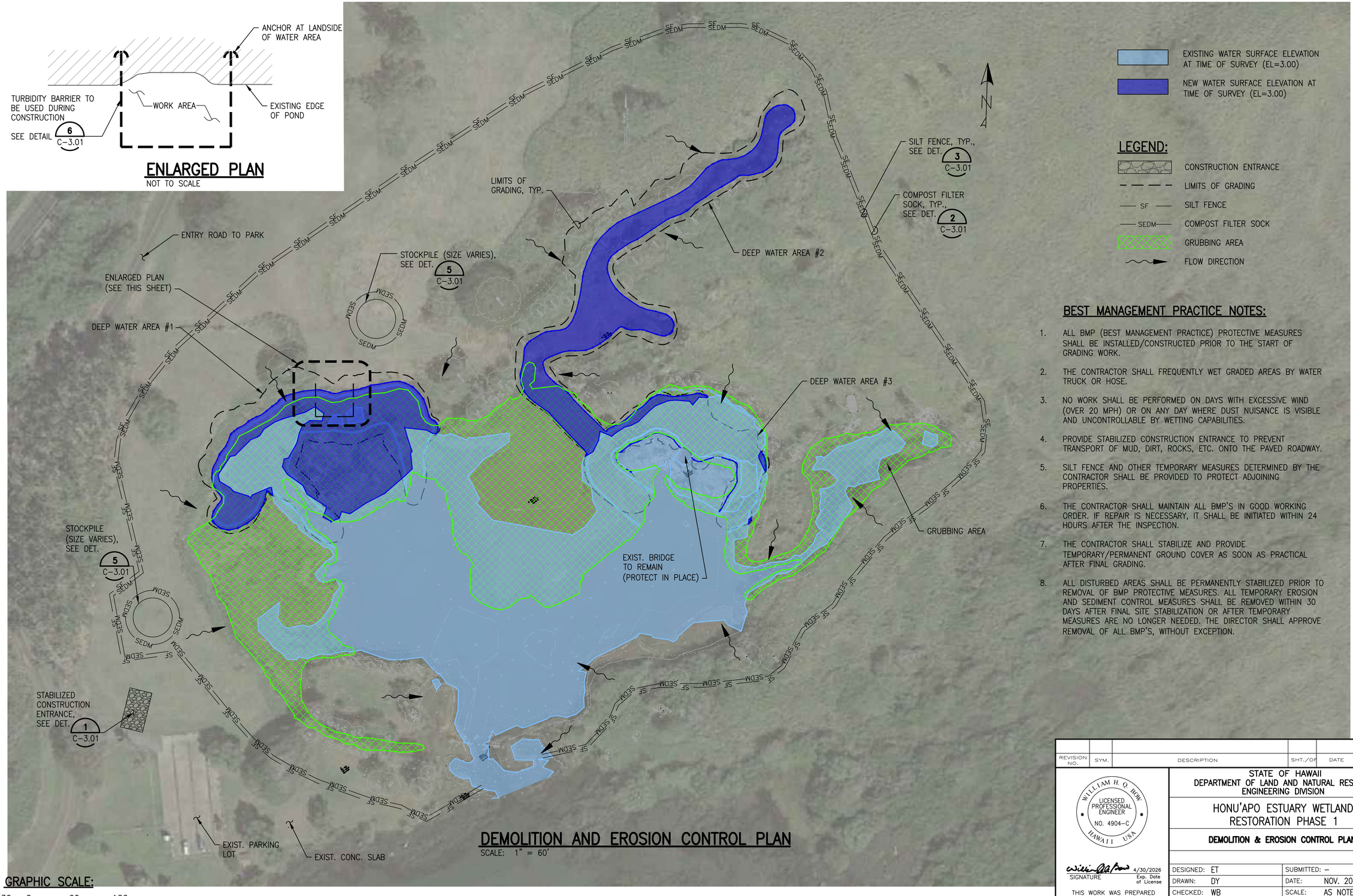


## DEMOLITION AND EROSION CONTROL PLAN

SCALE: 1" = 60'

## BEST MANAGEMENT PRACTICE NOTES:

1. ALL BMP (BEST MANAGEMENT PRACTICE) PROTECTIVE MEASURES SHALL BE INSTALLED/CONSTRUCTED PRIOR TO THE START OF GRADING WORK.
2. THE CONTRACTOR SHALL FREQUENTLY WET GRADED AREAS BY WATER TRUCK OR HOSE.
3. NO WORK SHALL BE PERFORMED ON DAYS WITH EXCESSIVE WIND (OVER 20 MPH) OR ON ANY DAY WHERE DUST NUISANCE IS VISIBLE AND UNCONTROLLABLE BY WETTING CAPABILITIES.
4. PROVIDE STABILIZED CONSTRUCTION ENTRANCE TO PREVENT TRANSPORT OF MUD, DIRT, ROCKS, ETC. ONTO THE PAVED ROADWAY.
5. SILT FENCE AND OTHER TEMPORARY MEASURES DETERMINED BY THE CONTRACTOR SHALL BE PROVIDED TO PROTECT ADJOINING PROPERTIES.
6. THE CONTRACTOR SHALL MAINTAIN ALL BMP'S IN GOOD WORKING ORDER. IF REPAIR IS NECESSARY, IT SHALL BE INITIATED WITHIN 24 HOURS AFTER THE INSPECTION.
7. THE CONTRACTOR SHALL STABILIZE AND PROVIDE TEMPORARY/PERMANENT GROUND COVER AS SOON AS PRACTICAL AFTER FINAL GRADING.
8. ALL DISTURBED AREAS SHALL BE PERMANENTLY STABILIZED PRIOR TO REMOVAL OF BMP PROTECTIVE MEASURES. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION OR AFTER TEMPORARY MEASURES ARE NO LONGER NEEDED. THE DIRECTOR SHALL APPROVE REMOVAL OF ALL BMP'S, WITHOUT EXCEPTION.

GRAPHIC SCALE:

60 30 0 60 120

1" = 60'

| REVISION NO. | SYM. | DESCRIPTION | SHT./OF | DATE | APPROVED |
|---|---|---|---|---|---|

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HAWAII USA

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DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

HONU'APO ESTUARY WETLAND RESTORATION PHASE 1

**DEMOLITION & EROSION CONTROL PLAN**

| | |
|---|---|
| DESIGNED: ET | SUBMITTED: – |
| DRAWN: DY | DATE: NOV. 2024 |
| CHECKED: WB | SCALE: AS NOTED |
| APPROVED: | DRAWING NO. C-1.01 |
| CHIEF ENGINEER | DATE |

JOB NO. D00PH60A SHEET NO. 4 OF 12 SHEETS

Plotted: Tue, 10 Dec, 2024 - 12:06pm By: ETANITOMI
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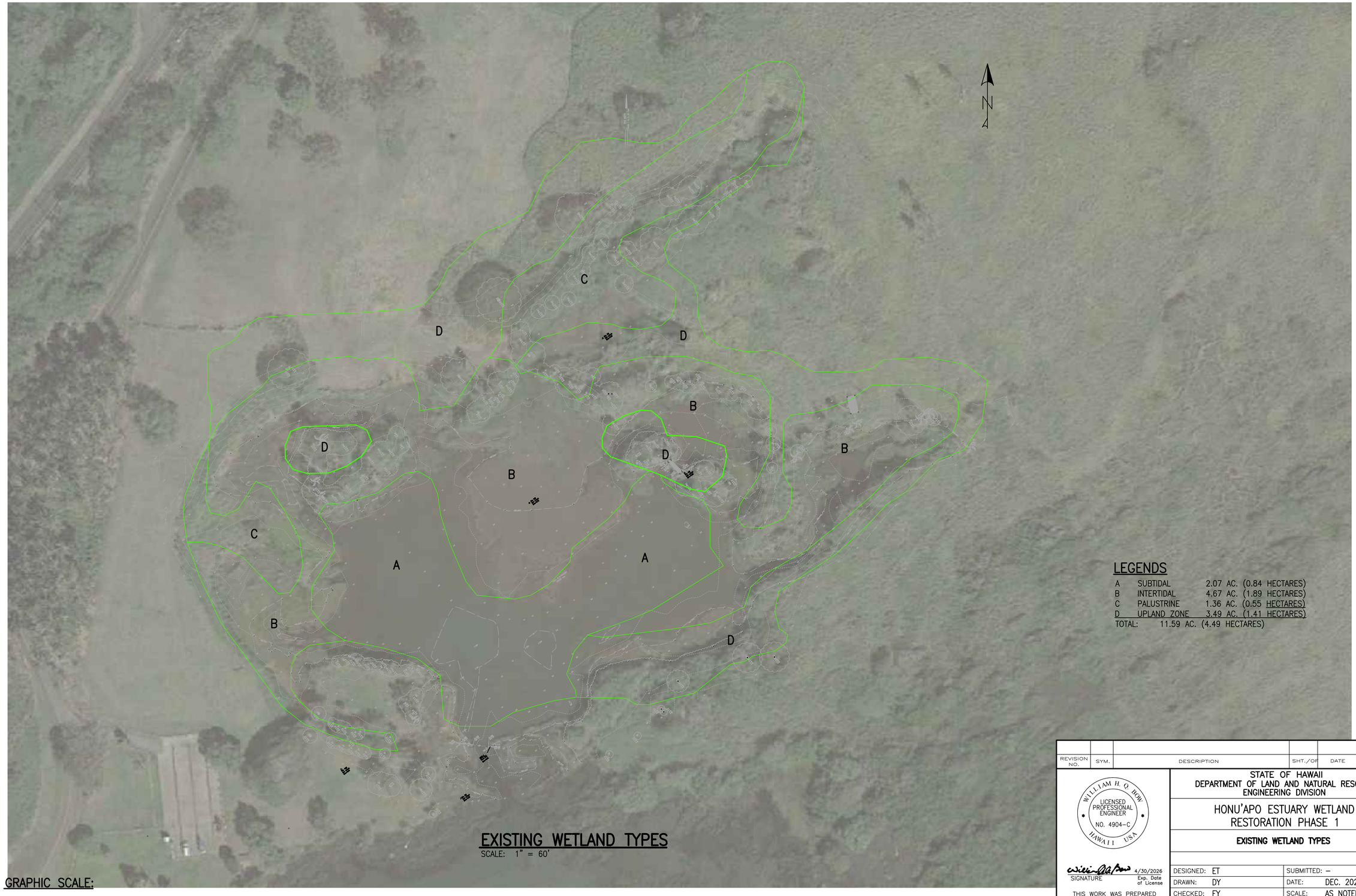


## LEGENDS

| | | | |
|---|---|---|---|
| A | SUBTIDAL | 2.07 AC. | (0.84 HECTARES) |
| B | INTERTIDAL | 4.67 AC. | (1.89 HECTARES) |
| C | PALUSTRINE | 1.36 AC. | (0.55 HECTARES) |
| D | UPLAND ZONE | 3.49 AC. | (1.41 HECTARES) |
| TOTAL: | | 11.59 AC. | (4.49 HECTARES) |

## EXISTING WETLAND TYPES

SCALE: 1" = 60'

GRAPHIC SCALE:

60 30 0 60 120

1" = 60'

| REVISION NO. | SYM. | DESCRIPTION | SHT./OF | DATE | APPROVED |
|---|---|---|---|---|---|
| | | | | | |

WILLIAM H. Q. BOW
LICENSED PROFESSIONAL ENGINEER
NO. 4904-C
HAWAII USA

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ENGINEERING DIVISION

HONU'APO ESTUARY WETLAND RESTORATION PHASE 1

**EXISTING WETLAND TYPES**

| | |
|---|---|
| DESIGNED: ET | SUBMITTED: – |
| DRAWN: DY | DATE: DEC. 2024 |
| CHECKED: EY | SCALE: AS NOTED |
| APPROVED: | DRAWING NO. C-1.02 |
| CHIEF ENGINEER | DATE |

JOB NO. D00PH60A SHEET NO. 5 OF 12 SHEETS

Plotted: Tue, 10 Dec 2024 – 12:02pm By: ETANITOMI
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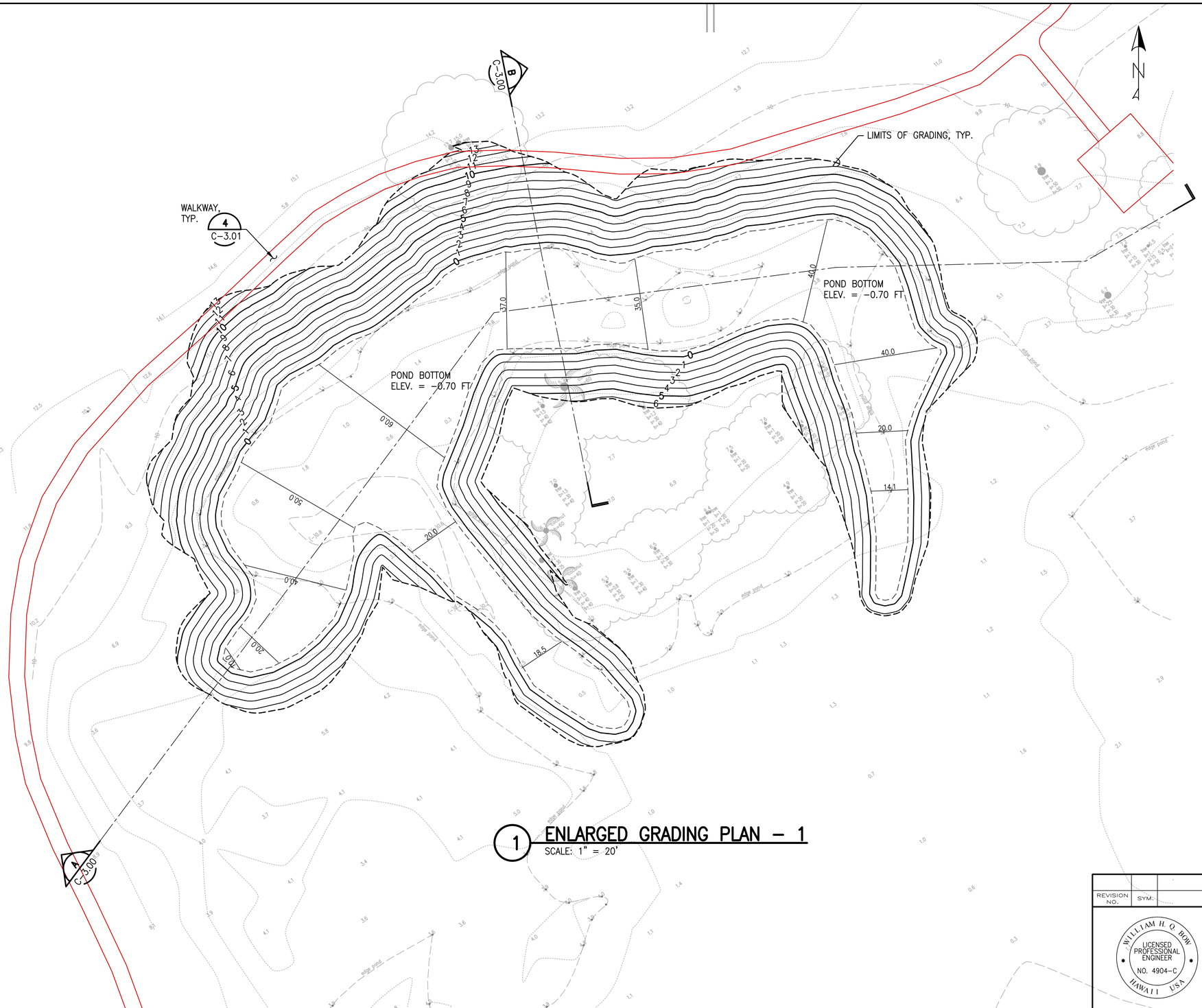


## LEGEND:

| | |
|---|---|
| XXX | FINISH MINOR GRADE CONTOUR |
| XXX | FINISH MAJOR GRADE CONTOUR |
| | EXIST. CONTOUR |
| | LIMITS OF GRADING |
| 20.0 | CHANNEL WIDTH (FT) |

## TOTAL EARTHWORK SUMMARY

EXCAVATION = 9,475 C.Y.
EMBANKMENT = 1 C.Y.
AREA TO BE GRADED/
DISTURBED AREA = 2.32 Acs.
FOR PERMIT PURPOSES ONLY

## 1 ENLARGED GRADING PLAN – 1

SCALE: 1" = 20'

## GRAPHIC SCALE:

20 10 0 20 40
1" = 20'

| REVISION NO. | SYM. | DESCRIPTION | SHT./OF | DATE | APPROVED |
|---|---|---|---|---|---|

WILLIAM H. Q. BOW
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NO. 4904-C
HAWAII USA

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HONU'APO ESTUARY WETLAND RESTORATION PHASE 1

**ENLARGED GRADING PLAN – 1**

| | |
|---|---|
| DESIGNED: ET | SUBMITTED: – |
| DRAWN: DY | DATE: DEC. 2024 |
| CHECKED: EY | SCALE: AS NOTED |
| APPROVED: | DRAWING NO. C-2.00 |
| CHIEF ENGINEER | DATE |

JOB NO. D00PH60A SHEET NO. 8 OF 12 SHEETS

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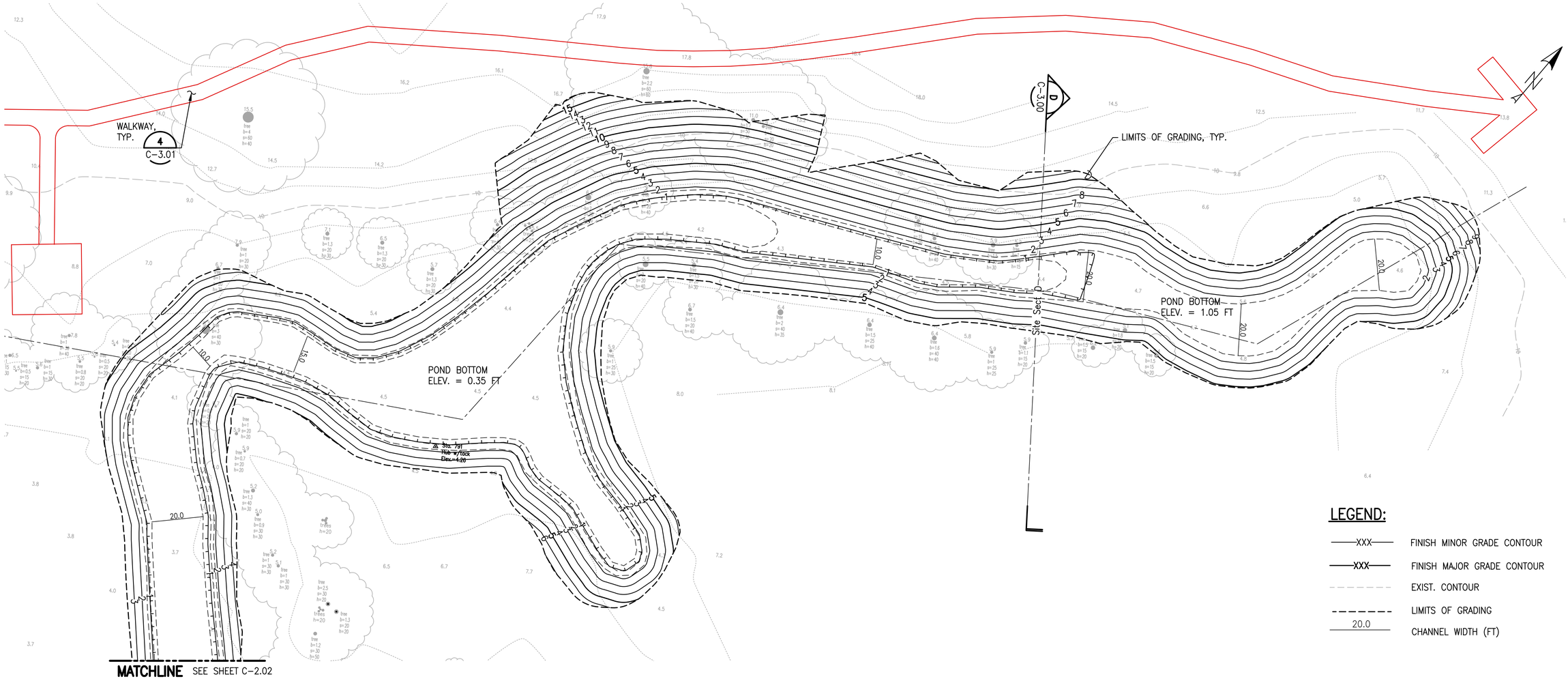


## LEGEND:

| | |
|---|---|
| ——XXX—— | FINISH MINOR GRADE CONTOUR |
| ——XXX—— | FINISH MAJOR GRADE CONTOUR |
| - - - - - - - | EXIST. CONTOUR |
| - - - - - - - | LIMITS OF GRADING |
| 20.0 | CHANNEL WIDTH (FT) |

## TOTAL EARTHWORK SUMMARY

EXCAVATION = 9,475 C.Y.
EMBANKMENT = 1 C.Y.
AREA TO BE GRADED/
DISTURBED AREA = 2.32 Acs.
FOR PERMIT PURPOSES ONLY

## 1 ENLARGED GRADING PLAN – 2

SCALE: 1" = 20'

GRAPHIC SCALE:

20 10 0 20 40

1" = 20'

| REVISION NO. | SYM. | DESCRIPTION | SHT./OF | DATE | APPROVED |
|---|---|---|---|---|---|
| | | | | | |

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DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

HONU'APO ESTUARY WETLAND RESTORATION PHASE 1

**ENLARGED GRADING PLAN – 2**

| | |
|---|---|
| DESIGNED: ET | SUBMITTED: – |
| DRAWN: DY | DATE: DEC. 2024 |
| CHECKED: EY | SCALE: AS NOTED |
| APPROVED: | DRAWING NO. C-2.01 |
| CHIEF ENGINEER | DATE |



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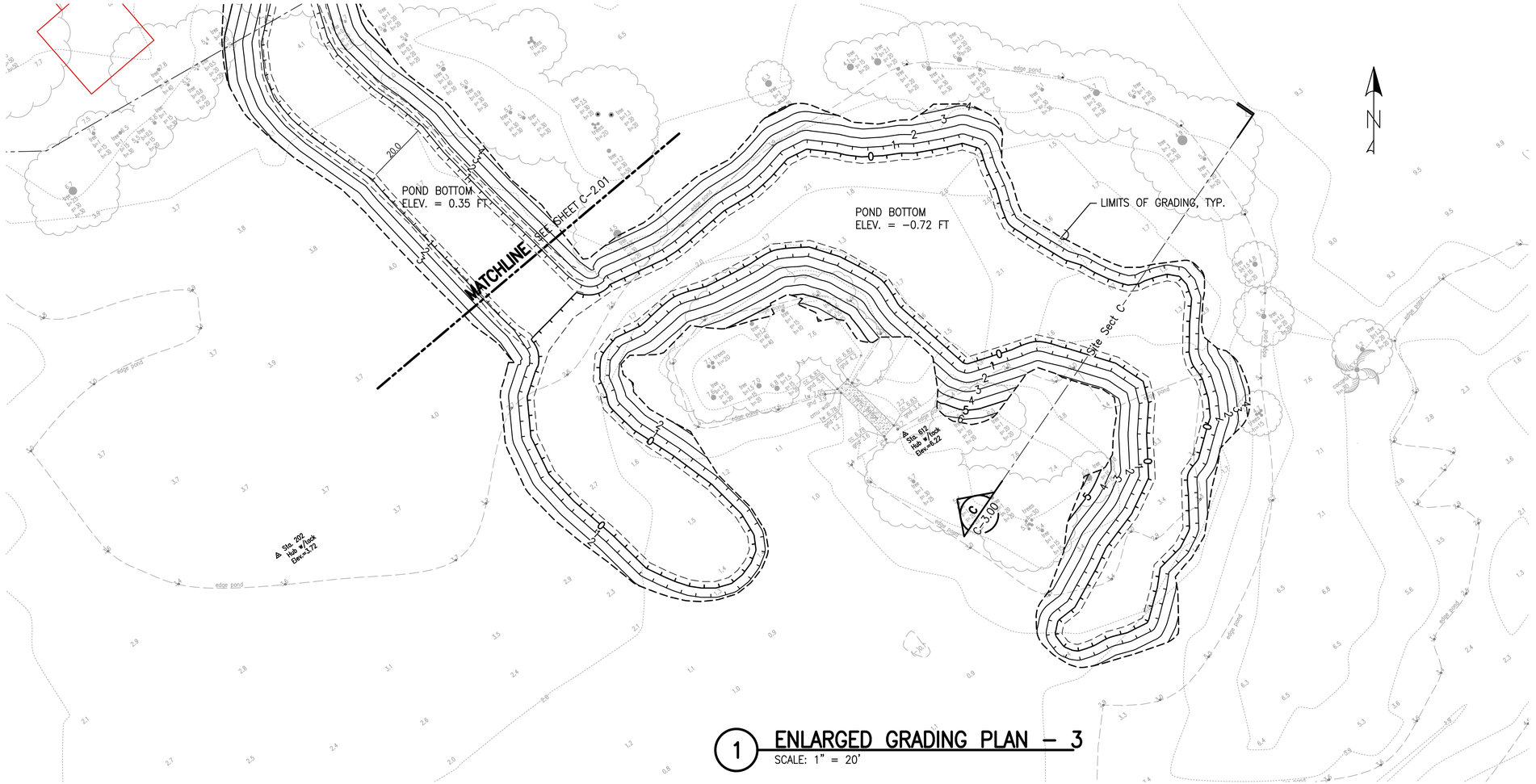


## 1 ENLARGED GRADING PLAN – 3

SCALE: 1" = 20'

## LEGEND:

- XXX — FINISH MINOR GRADE CONTOUR
- XXX — FINISH MAJOR GRADE CONTOUR
- EXIST. CONTOUR
- LIMITS OF GRADING
- 20.0 — CHANNEL WIDTH (FT)

## TOTAL EARTHWORK SUMMARY

EXCAVATION = 9,475 C.Y.
EMBANKMENT = 1 C.Y.
AREA TO BE GRADED/
DISTURBED AREA = 2.32 Acs.
FOR PERMIT PURPOSES ONLY

## GRAPHIC SCALE:

20 10 0 20 40
1" = 20'

| REVISION NO. | SYM. | DESCRIPTION | SHT./OF | DATE | APPROVED |
|---|---|---|---|---|---|
| | | | | | |

WILLIAM H. Q. BOW
LICENSED PROFESSIONAL ENGINEER
NO. 4904-C
HAWAII USA

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DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

HONU'APO ESTUARY WETLAND RESTORATION PHASE 1

**ENLARGED GRADING PLAN – 3**

| | |
|---|---|
| DESIGNED: ET | SUBMITTED: – |
| DRAWN: DY | DATE: DEC. 2024 |
| CHECKED: EY | SCALE: AS NOTED |
| APPROVED: | DRAWING NO. C-2.02 |
| CHIEF ENGINEER | DATE |

JOB NO. D00PH60A SHEET NO. 10 OF 12 SHEETS

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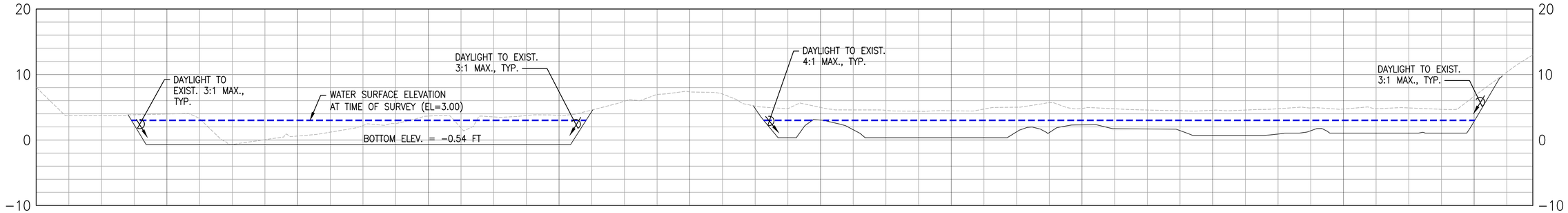
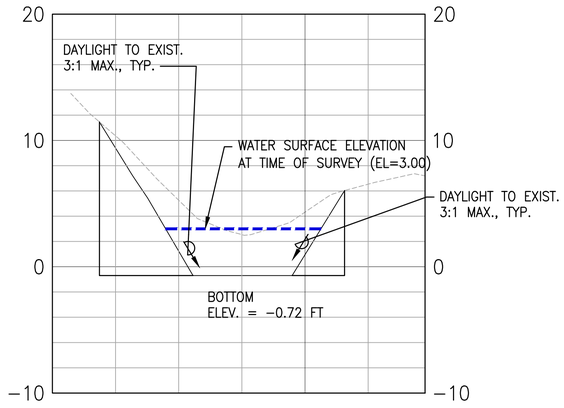


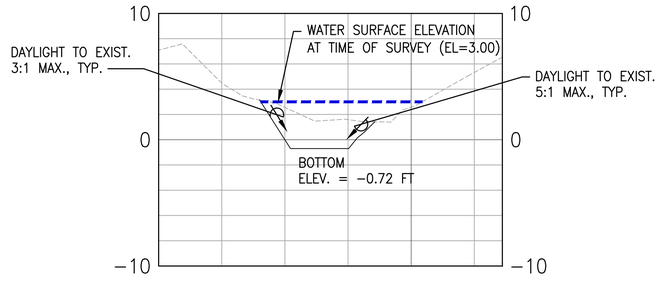

## A SITE SECTION

SCALE: HORIZ. 1"=30'
VERT. 1"=6'



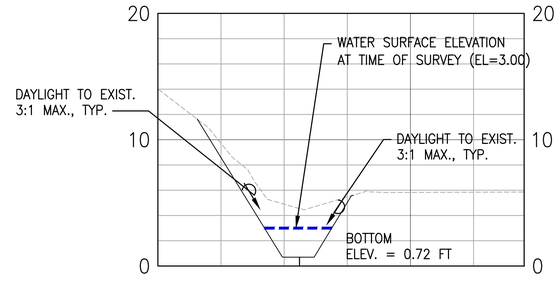

## B SITE SECTION

SCALE: HORIZ. 1"=30'
VERT. 1"=6'




## C SITE SECTION

SCALE: HORIZ. 1"=30'
VERT. 1"=6'




## D SITE SECTION

SCALE: HORIZ. 1"=30'
VERT. 1"=6'

## GRAPHIC SCALE:

6 3 0 6 12
1" = 6'

30 15 0 30 60
1" = 30'

| REVISION NO. | SYM. | DESCRIPTION | SHT./OF | DATE | APPROVED |
|---|---|---|---|---|---|
| | | | | | |

WILLIAM H. Q. BOW
LICENSED PROFESSIONAL ENGINEER
NO. 4904-C
HAWAII USA

4/30/2026
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DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

HONU'APO ESTUARY WETLAND RESTORATION PHASE 1

**SECTIONS**

| | |
|---|---|
| DESIGNED: ET | SUBMITTED: – |
| DRAWN: DY | DATE: DEC. 2024 |
| CHECKED: EY | SCALE: AS NOTED |
| APPROVED: | DRAWING NO. C-3.00 |
| CHIEF ENGINEER / DATE | |

JOB NO. D00PH60A SHEET NO. 11 OF 12 SHEETS

Plotted: Tue, 10 Dec 2024 – 12:03pm By: ETANITOMI
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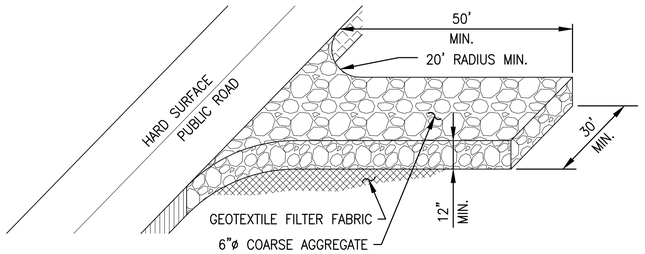
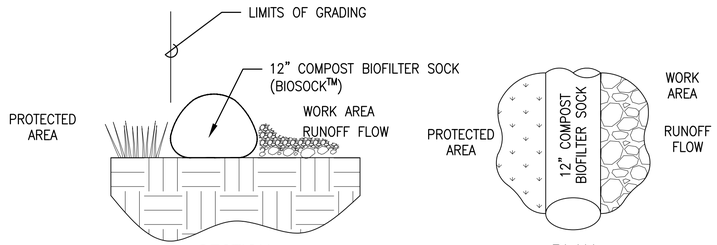
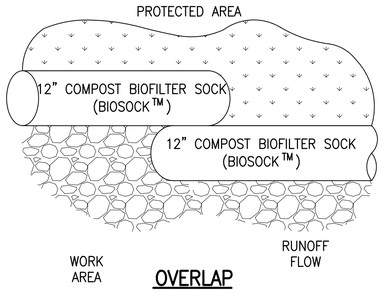



## 1 STABILIZED CONSTRUCTION ENTRANCE
NOT TO SCALE

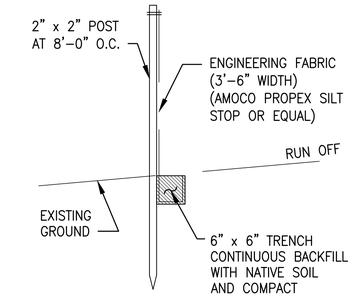



**NOTES:**

1. COMPOST SHALL NOT CONTAIN BIOSOLIDS AND SHOULD BE CONSISTENT WITH EPA GUIDELINES.
2. STAKING OF COMPOST FILTER SOCK IS NOT REQUIRED.

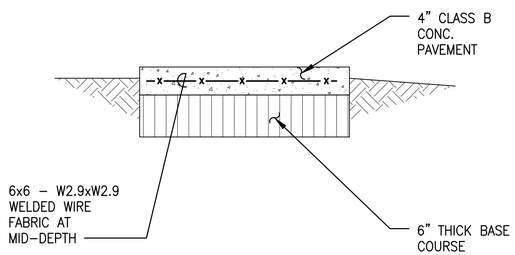
## 2 COMPOST FILTER SOCK DETAIL
NOT TO SCALE



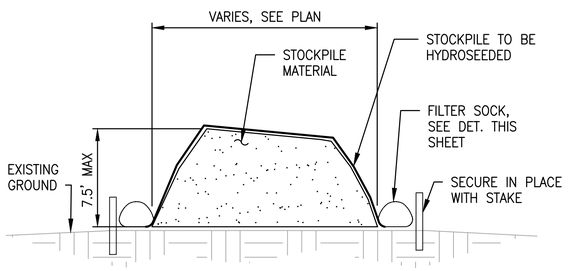

## 3 TYPICAL SILT FENCE DETAIL
NOT TO SCALE

**NOTES:**

1. PROVIDE SMOOTH CONNECTION BETWEEN NEW AND EXISTING CONCRETE SIDEWALK.
2. CONTRACTOR MUST COMPLY WITH CITY'S JOINTING POLICY DATED APRIL 6, 2009 FOR NEW S/W.

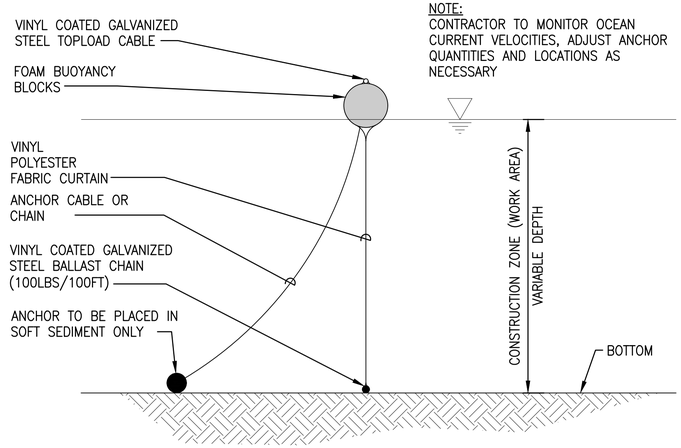



## 4 CONCRETE WALKWAY DETAIL
NOT TO SCALE




NOTE:
STOCKPILE SHALL BE HYDROSEEDED.

## 5 STOCKPILE STABILIZATION DETAIL
NOT TO SCALE




NOTE:
CONTRACTOR TO MONITOR OCEAN CURRENT VELOCITIES, ADJUST ANCHOR QUANTITIES AND LOCATIONS AS NECESSARY

## 6 TURBIDITY CURTAIN
NOT TO SCALE

| REVISION NO. | SYM. | DESCRIPTION | SHT./OF | DATE | APPROVED |
|---|---|---|---|---|---|
| | | | | | |

WILLIAM H. Q. BOW
LICENSED PROFESSIONAL ENGINEER
NO. 4904-C
HAWAII USA

SIGNATURE 4/30/2026 Exp. Date of License

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

HONU'APO ESTUARY WETLAND
RESTORATION PHASE 1

**MISCELLANEOUS DETAILS**

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| DRAWN: DY | DATE: DEC. 2024 |
| CHECKED: EY | SCALE: AS NOTED |
| APPROVED: | DRAWING NO. C-3.01 |
| CHIEF ENGINEER | DATE |

JOB NO. D00PH60A SHEET NO. 12 OF 12 SHEETS

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# APPENDIX C

Soil Sampling Characterization Report

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# SOIL SAMPLING CHARACTERIZATION REPORT

# HONUAPO ESTUARY WETLAND RESTORATION PROJECT

**AUGUST 25, 2023**

**PREPARED FOR:**

State of Hawai‘i, Department of Land and Natural Resources
Division of Forestry and Wildlife
2135 Makiki Heights Drive
Honolulu, Hawaii 96822

**PREPARED BY:**

Bow Engineering & Development, Inc.
*Civil Engineering* *Planning*

1953 South Beretania Street, PH-A
Honolulu, Hawai‘i 96826
Telephone: (808) 941-8853
Fax: (808) 945-9299
www.bowengineering.com

## INTRODUCTION

The purpose of this report is to present the soil characterization results of potential pollutants present at the Honu‘apo Estuary Wetland Restoration project in the Ka‘u District, on the Island of Hawai‘i. The soil screening was conducted on June 20, 2023, to determine what contaminants may be present around the project site in areas planned for grading and dredging. Soil was sampled and analyzed to identify the presence (if any) of contaminated soil remaining from the historic sugar plantation era (late 1800s to early 1900s), as well as more recent impacts caused by development in upland areas. These preliminary results may be used for planning purposes in construction cost estimating and bidding. The identification of potential pollutants in this study may not fully characterize or identify all pollutants or concentrations of pollutants that may be assessed during construction; additional testing of soil stockpiles is recommended prior to disposal during construction.

## PROJECT LOCATION AND DESCRIPTION

The Honu‘apo Estuary Wetland Restoration project site includes ±8-acres of estuary and marsh habitat located along the coast in the Ka‘ū District, on the Island of Hawai‘i. The project site is within Honu‘apo Park, an approximately 225-acre area that includes the County of Hawai‘i Whittington Beach Park (see Figure 1). The project site is located on a portion of Tax Map Key: (3) 9-5-014:007.

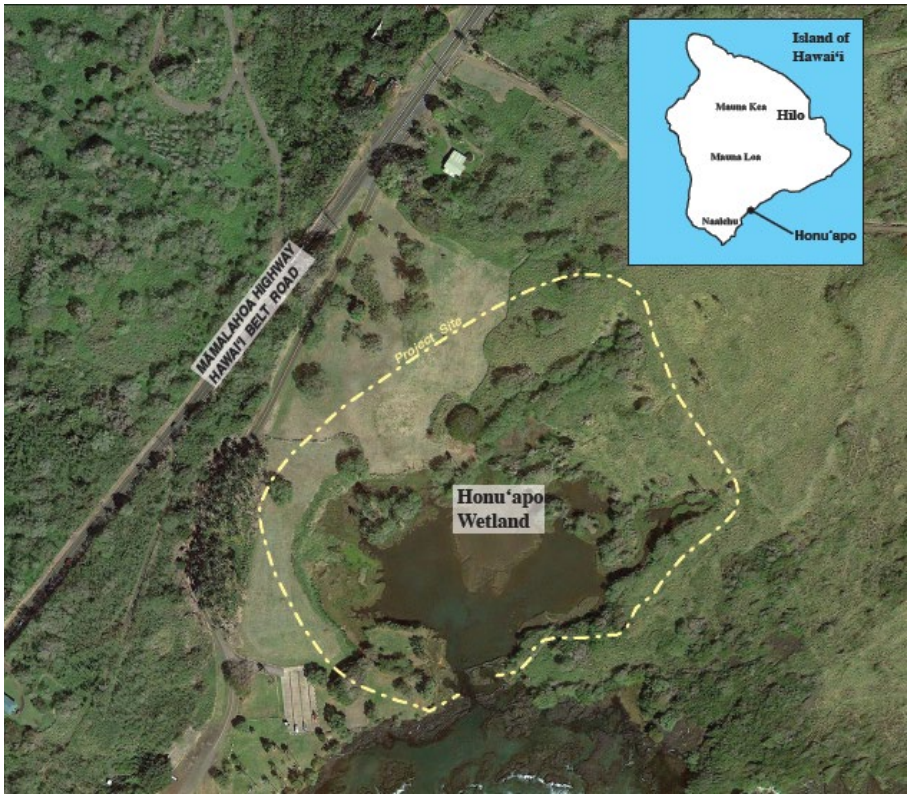


Figure 1 - Project Location Map

Preconstruction soil sampling was conducted prior to any ground disturbing activities. A random sampling collection scheme was utilized to collect three Multi-Increment[1] (MI) samples within three areas for laboratory analysis. The methods, references, hold times, and preservations required for laboratory analysis of soil samples are described in Table 1.

| **PRE CONSTRUCTION LAB ANALYSIS FOR SOIL** (Analytical methods and preservation requirements for laboratory analysis) | | | |
|---|---|---|---|
| **Analysis** | **Units** | **Method** | **Preservation** |
| Toxicity Characteristic Leaching Procedure (TCLP) Metals (Arsenic and Lead) | mg/Kg | EPA 6010B | 6 °C |
| Total Metals | mg/Kg | EPA 6010B | 6 °C |
| Polychlorinated Biphenyls (PCBs, Total Aroclor) | mg/Kg | EPA 8082A | 6 °C |
| Volatiles | ug/kg | EPA 8260D | 6 °C |
| Dioxins/Furans | mg/Kg | EPA 8290A | 6 °C |
| Organochlorine Pesticides (Aldrin, Chlordane, Dieldrin, Endosulfan, Endrin, Heptachlor, Heptachlor Epoxide, Dichlorodiphenyldichoroethane (DDD), Dichlorodiphenyldichoroethylene (DDE), Dichlorodiphenyltrichoroethane (DDT)) | mg/Kg | EPA 8081 | 6 °C |

Table 1. Analytical methods/references to be used for sample analysis of soil.

Three (3) Decision Units (DUs) were chosen for soil collection based on the project scope and project area of the proposed excavation and dredging. Each DU contained 30 MI samples taken from depths of 1-inch to 24-inches below the ground surface to represent the approximate depths of disturbance. DU1 was sampled in triplicate which included one primary sample and two replicate samples. The general GPS coordinates (degrees and decimal minutes in WGS84 datum from Google Earth) are shown in Table 2 (next page).

[1] MULTI INCREMENT® is a registered trademark of EnviroStat, Inc.

| DECISION UNIT | GPS COORDINATES | |
|---|---|---|
| DU1 | 19.087594 N | 155.547639 W |
| DU2 | 19.087636 N | 155.548904 W |
| DU3 | 19.087978 N | 155.547996 W |

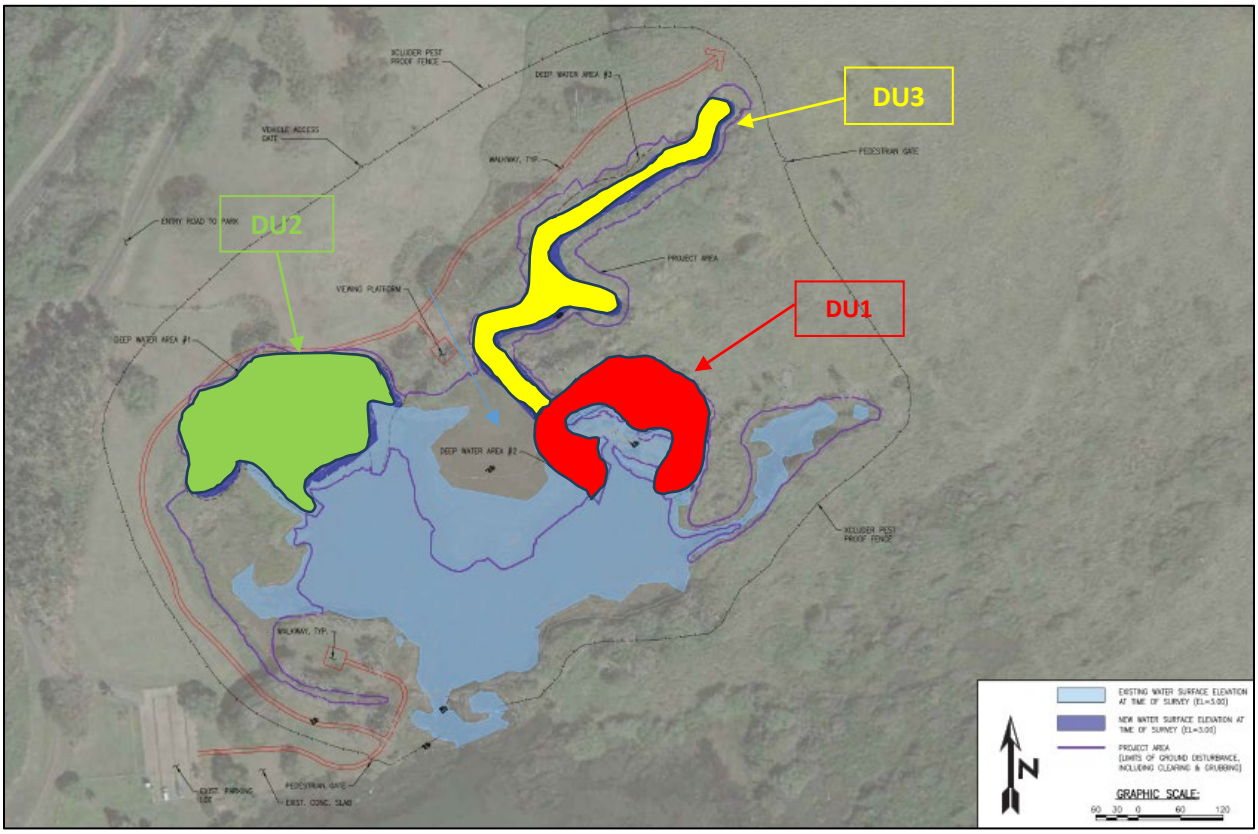


Table 2. Location of DU areas sampled

Photographs were taken of the DU areas from various directions during the monitoring period to capture the general site conditions (Table 3).

Decision Unit 1 Photos – June 20, 2023

Table 3a. Decision Unit 1 area.

Decision Unit 2 Photos – June 20, 2023

Table 3b. Decision Unit 2 area.

Decision Unit 3 Photos – June 20, 2023

Table 3c. Decision Unit 3 area.

## DISCUSSION AND CONCLUSION

In summary, volatiles, metals, and dioxins were detected in the soils from at least one DU however, concentrations were well below the Department of Health (DOH) Tier 1 Environmental Action Levels (EALs) for reuse as unrestricted fill. PCBs and Organochlorine Pesticides were not detected in any of the DUs. The full details of the analytical report are provided in Appendix A. Appendix B provides the chain of custody for the analytical samples submitted to the laboratory.

| HONUAPO SOIL SAMPLING RESULTS (June 20, 2023) | | | | | | |
|---|---|---|---|---|---|---|
| **Analyte (mg/kg)** | **1-A** | **1-B** | **1-C** | **2** | **3** | **HDOH Tier 1 Unrestricted EAL** |
| **Volatiles (ug/kg)** | | | | | | |
| 4-Isopropyltoluene | 0.34 | ND | 0.18 | 0.28 | 0.056 | N/A |
| **PCBs (mg/kg)** | | | | | | |
| Polychlorinated Biphenyls | ND | ND | N/A | ND | ND | 1.20 |
| **TCLP Metals (mg/kg)** | | | | | | |
| Arsenic | 0.014 | 0.013 | N/A | 0.013 | ND | 24.0 |
| Lead (Pb) | ND | ND | N/A | 0.036 | ND | 200.0 |
| **Total Metals (mg/kg)** | | | | | | |
| Lead (Pb) | 6.1 | 12 | N/A | 2.7 | 1.1 | 200.0 |
| Silver | 0.3 | ND | N/A | 0.13 | 0.067 | 78.0 |
| Antimony | 0.44 | ND | N/A | 0.33 | 0.094 | 6.3 |
| Arsenic | 22 | ND | N/A | 15 | 4.1 | 24.0 |
| Barium | 18 | ND | N/A | 20 | 57 | 1,000.0 |
| Beryllium | 0.47 | ND | N/A | 0.4 | 0.68 | 31.0 |
| Cadmium | 0.32 | ND | N/A | 0.27 | 0.42 | 14.0 |
| Chromium | 240 | ND | N/A | 180 | 280 | 1,100.0 |
| Cobalt | 27 | ND | N/A | 19 | 49 | 80.0 |
| Copper | 140 | ND | N/A | 80 | 110 | 630.0 |
| Lead (Pb) | 15 | ND | N/A | 9.3 | 2.5 | 200.0 |
| Molybdenum | 3.2 | 3.2 | N/A | 5 | 0.73 | 78.0 |
| Nickel | 200 | 210 | N/A | 130 | 190 | 410.0 |
| Selenium | 4.7 | 5.1 | N/A | 5.1 | 5.9 | 78.0 |
| Thallium | 0.061 | ND | N/A | 0.063 | ND | 0.8 |
| Vanadium | 150 | 160 | N/A | 130 | 130 | 770.0 |
| Zinc | 120 | 110 | N/A | 93 | 100 | 1,000.0 |
| **Dioxins (mg/g)** | | | | | | |
| Total TEQ Furans* | 2.75 | 2.88 | N/A | 1.88 | 0.31 | 240 |
| Total TEQ Dioxin* | 8.07 | 7.29 | N/A | 6.39 | 1.29 | |
| **Organochlorine Pesticides (mg/kg)** | | | | | | |
| | ND | ND | N/A | ND | ND | N/A |

NOTES:
D = Detected and **under** the HDOH EAL
ND = Not Detected
N/A = Not Applicable (Sample not Analyzed)
* = Total TEQ Furans and Total TEQ Dioxin were calculated using the HDOH HEER Dixoin TEQ Calculator

Table 4. Analytical results of Decision Units.

During transit to the laboratory, one of the two replicate samples (identified as sample 1C) was cross contaminated with melted ice used to regulate the temperature inside the shipping cooler therefore, analysis for this sample was limited to VOCs (preserved in a separate sealed container).

It is recommended that additional samples be collected and analyzed from soil stockpiles during construction to further verify the results presented in this report to determine the appropriate soil disposal or re-use parameters.

# APPENDIX A

## Laboratory Analytical Report

(Available on Request)

# APPENDIX D

Storm Drainage Analysis

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## STORM DRAINAGE ANALYSIS FOR

# HONU'APO ESTUARY WETLAND REHABILITATION

Ka'u, Hawai'i
TMK: (3) 9-5-014:007

May 2025

**Prepared For:**

County of Hawai'i
Department of Land and Natural Resources
1151 Punchbowl Street, Room 310
Honolulu, Hawai'i 96813

**Prepared By:**

**Bow Engineering & Development, Inc.**

*Civil Engineering* *Planning*

1953 South Beretania Street, PH-A
Honolulu, Hawai'i 96826
Telephone: (808) 941-8853
Fax: (808) 945-9299
www.bowengineering.com

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## PROJECT LOCATION & DESCRIPTION

The project site is located at Honu'apo Estuary in Ka'u, Hawai'i, identified by TMK: (3) 9-5-014:007. Situated along the southern coast of the Island of Hawai'i, the site is part of the 225-acre Honu'apo Park, which includes the County's Whittington Beach Park. The estuary is within an 8-acre wetland area that features three distinct wetland types: subtidal, intertidal, and palustrine. A Project Location Map is provided in Figure 1 below.

The proposed improvements will involve dredging the wetland, removing invasive vegetation, replanting with native species, and ongoing maintenance of the restored area. The total area disturbed area will be approximately 5.25 acres.

**Figure 1 - Project Location Map**

## EXISTING CONDITIONS

The existing site features a pond surrounded by dense vegetation, with soil consisting of the Kanohina-Lava flows complex, characterized by slopes ranging from 2% to 10%. This type of lava rock is highly permeable, allowing for excellent drainage but also resulting in very high runoff potential. Elevations on the site vary from approximately sea level (0 feet) to 19 feet.

Currently, there is no formal drainage system in place. Runoff from the site naturally flows toward the pond, where it is collected and stored.

See Figure 2 for the Existing Drainage Map.

BASIN A
A=5.25 AC
$Q_{10}$=8.80 CFS

N

LEGEND

DRAINAGE BASIN

LIMITS OF POND

FLOW DIRECTION

FIGURE 2
# EXISTING DRAINAGE MAP
SCALE: 1" = 100'

GRAPHIC SCALE

100 50 0 100 200

1" = 100'

H:\FY2018\18032 Honuapo Wetland Rehabilitation\10 Analysis & Permits\Drainage\Files\Fig 2 - Honuapo - Existing Drainage.dwg

## PROPOSED CONDITIONS

The proposed project involves the removal of invasive non-native plant species, excavation of approximately 250,000 cubic feet of soil material, and recontouring the topography to improve the physical habitat. Additionally, native and endemic plants will be introduced to restore the ecological balance. Importantly, there will be no significant increase in impervious surface area, ensuring that the site's overall drainage capacity is enhanced rather than compromised.

The proposed drainage design will align with existing flow patterns, with the entire project area located within a single basin. Runoff within the drainage basin will either infiltrate and/or flow to the pond, maintaining the integrity of the current drainage system while improving its capacity to manage stormwater.

See Figure 3 for the Proposed Drainage Map.

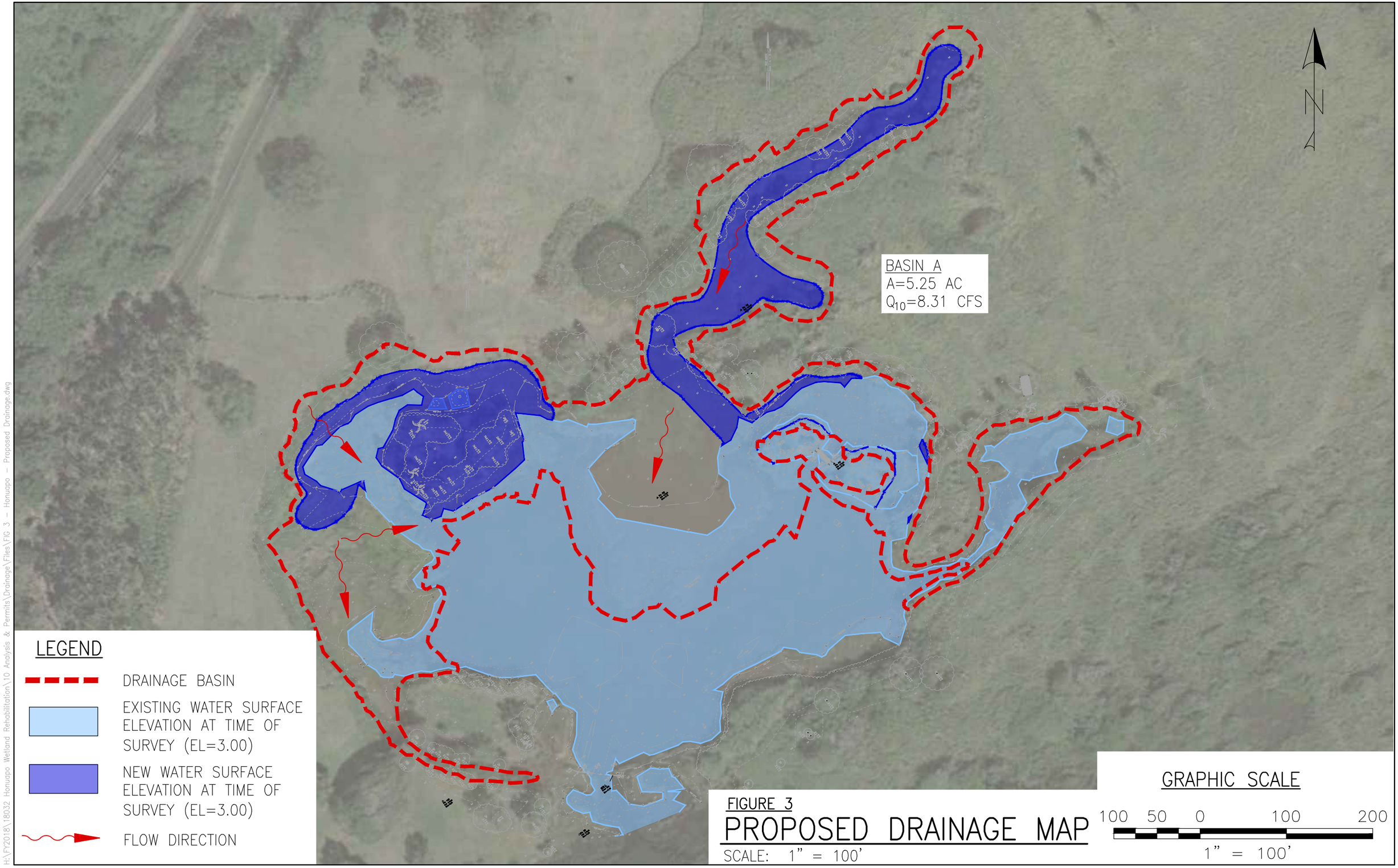



FIGURE 3

# PROPOSED DRAINAGE MAP

SCALE: 1" = 100'

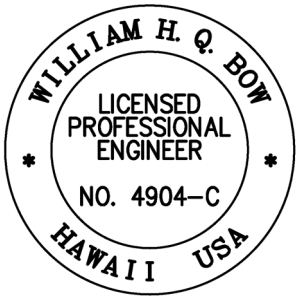
H:\FY2018\18032 Honuapo Wetland Rehabilitation\10 Analysis & Permits\Drainage\Files\FIG 3 - Honuapo - Proposed Drainage.dwg

## CONCLUSION

The proposed project will expand the volume of the existing pond by approximately 250,000 cubic feet, enhancing its capacity to manage stormwater without increasing the site's storm runoff rate. As a result, the project will not disrupt existing drainage patterns, ensuring that current water flow conditions remain unchanged, and the surrounding area is not adversely impacted.

THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION AND
CONSTRUCTION OF THIS PROJECT WILL
BE UNDER MY OBSERVATION

Expiration Date: 04/30/26




## REFERENCES

*Storm Drainage Standards.*
Department of Public Works, County of Hawaii
October 1970.

*NOAA Atlas 14, Volume 3 - Rainfall Frequency Atlas of the Hawaiian Islands*
US Department of Commerce Weather Bureau, 2009

# APPENDIX A

# RAINFALL FACTORS
**(Available Upon Request)**

# APPENDIX E

2022 Biological Resources Update for Honu‘apo Estuary

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# 2022 Biological Resources Update for Honuʻapo Estuary

**FINAL REPORT:** July 23, 2022

*Honuʻapo Estuary, view north. PC: Ka ʻOhana O Honuʻapo (KOOH).*


Prepared for:
Hawaiʻi Department of Land and Natural Resources - Division of Forestry and Wildlife and Bow Engineering & Development, Inc.

Prepared by:
Megan R. Lamson, Jodie R. Rosam, K. Kalāhoʻohie Mossman - Ka ʻOhana O Honuʻapo

**ACKNOWLEDGEMENTS**

Fieldwork for this 2022 update was conducted at Honuʻapo on May 9th and May 28th, 2022, by three Ka ʻOhana O Honu ʻapo (KOOH) Board members: Kalāhoʻohie Mossman / President (loko iʻa practitioner, Executive Officer with the Edith Kanakaʻole Foundation), Megan Lamson / Secretary (marine biologist, Hawaiʻi Program Director with Hawaiʻi Wildlife Fund [HWF]), and Jodie Rosam / Director (botanist, Plant Program Coordinator with HWF). This update also includes insight from a dozen additional KOOH or HWF workdays conducted at Honuʻapo by KOOH Board members from March 2021 to March 2022. Several other KOOH Board members (Nohealani Kaʻawa / The Nature Conservancy [TNC], Ken Sugai / Keauhou Nursery, Daniel Dierking / Hawaiʻi Fire Department) and other revelant specialists (John Replogle / retired TNC and co-founder of KOOH, Maura Naughton / retired USFWS and current HWF board member, Bret Mossman / DOFAW and Birds of Hawaiʻi Past Present, and Lindsey Kramer / CoraLight Consulting) reviewed or contributed to this update. University of Hawaiʻi at Hilo marine science student and HWF intern, Katie Cartee, also provided content and feedback to this 2022 revision.

The authors would like to specifically acknowledge the large body of work that has previously been done by Sustainable Resources Group International, Inc. (SRGII) on this topic.

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## 1.0 Overview

The purpose of the 2011 work was to provide a framework for local community group and non-profit organization Ka ʻOhana O Honuʻapo (KOOH), Hawaiʻi County, and partners in their efforts to protect and restore the flora and fauna of Honuʻapo Estuary. This survey was included within the 2.5 Ecological Features section of the Wetlands Habitat Restoration Plan for Honuʻapo Estuary that was published in May, 2011. The layout of this 2022 update is the similar to the SRGII report with some updates based on more recent surveys and observations during KOOH wetland / fishpond restoration workdays that have been hosted regularly since March 2021. This report will be shared with the Department of Land and Natural Resources (DLNR)'s staff and the consulting firm, Bow Engineering & Development, Inc., hired by DLNR's Division of Forestry and Wildlife (DOFAW) to help secure the necessary permits needed to conduct the Phase 1 wetland restoration activities as proposed by the USFWS 2011 National Coastal Wetland Conservation Grant Award entitled "Honuʻapo Estuary Wetland Restoration". Throughout this report, Honuʻapo Estuary and project site are used interchangeably.

## 2.0 Ecological Features

### 2.1 Vegetation

There are three primary vegetation zones within the project area: wetland, coastal strand, and upland. Wetland vegetation includes emergent plants like reeds, sedges, grasses, and some trees; coastal strand plants are more low-lying and salt-tolerant, and mostly found between makai (ocean side) of the estuary and along the coastline; and the upland plant community includes grasses, shrubs, bushes and trees and is found mauka (mountain side) of the wetland. A summary description of all three zones is provided below, and an updated species list as of June, 2022 is provided in Table 1.

#### *2.1.1 Wetland Plant Community*

The dominant overstory plant species in the wetlands of Honuʻapo Estuary are milo (*Thespesia populnea*), a tree likely introduced by Polynesians, and the invasive tree, kiawe (mesquite, *Prosopis pallida*). Grasses dominate the understory. These include the dominant native grass ʻakiʻaki (*Sporobolus virginicus*) and invasive seashore paspalum (*Paspalum vaginatum*). Other prevalent non-native and invasive grass species within the wetland region include California grass (*Urochloa mutica*) and manienie (Bermuda grass, *Cynodon dactylon*), but these tend to be limited to areas above the higher high tide area. Within the wetland area, the native ʻākulikuli (sea purslane, *Sesuvium portulacastrum*) is common, and in the intertidal and palustrine zones near the freshwater seeps and springs at the mauka side of the estuary, the native nānaku (giant bulrush, *Schoenoplectus tabernaemontani*) is thriving in large, clumping patches. Additionally, in

these shallow backwater areas, there is now at least one type of marine limu (seaweed) species present, likely a *Cladophora* sp. that may have been introduced on the tabies / shoes of shoreline users or fishermen that also frequent other wetland habitats in Hawai‘i. While this species is native and not invasive, per se, it can degrade the habitat for other native species.

### *2.1.2 Upland Plant Community*

The uplands directly adjacent to the wetland area are dominated by non-native invasive species, including haole koa (*Leucaena leucocephala*), Guinea grass (*Panicum maximum*), beach heliotrope (*Tournefortia argentea*), and kiawe *(Prosopis pallida*), as well as Christmas berry (*Schinus terebinthifolius*), Java plum (*Syzygium cumini*), and sourbush (*Pluchea odorata*). Other invasive species within the upland area include ‘opiuma (Manila tamarind, *Pithecellobium dulce*), sea grape (*Coccoloba uvifera*), and Chinese banyan (*Ficus microcarpa*). Few native plant species occur in the uplands due to the high level of disturbance in the area, though niu (coconut palms, *Cocos nucifera*) and hala (*Pandanus tectorius*) are present in small patches.

### *2.1.3 Coastal Strand Plant Community*

The coastal strand vegetation community is located between the shoreline and estuary and is dominated by native plants adapted to an environment of sea spray, including naupaka kahakai (*Scaevola taccada*), ‘ākulikuli, and mau‘u ‘aki‘aki (*Fimbristylis cymosa*). It is likely that the coastal strand community was once more diverse and included other species commonly found along the Ka‘ū coastline.

### *2.1.4 Updates to Vegetation Surveys in 2022*

While the majority of our findings in 2022 were consistent with those of the 2011 report produced by SRGII, we did note a few changes in the vegetation at Honu‘apo. First, many of the coastal strand species recorded in 2011 were not observed in 2022, including ‘ilima (*Sida fallax*), pa‘u o hi‘iaka (*Jacquemontia ovalifolia*), pōhuehue (beach morning glory, *Ipomoea pes-caprae brasiliensis*), nehe (*Melanthera integrifolia*), and kīpūkai (seaside heliotrope, *Heliotropium curassavicum*), as well as one wetland species (makaloa, *Cyperus laevigatus*). However, these would all be good candidates for outplanting and revegetation projects, as they are found elsewhere along the Ka‘ū coastline. Second, the predominant wetland grass species identified in 2022 was the native ‘aki‘aki and not the invasive seashore paspalum as referenced in 2011. It should be noted that seashore paspalum is still present at Honu‘apo, but it only dominates one small region at the south end of the estuary.

Additional species recorded in 2022 which were not referenced in the 2011 report include beach heliotrope, which is present between the boundary of the wetland and the upland plant zones

within the milo trees), sea grape, hibiscus (*Hibiscus rosa-sinensis*), and banyan trees which are scattered throughout the wetlands, monkeypod (*Samanea saman*) located near the picnic table on the northeast side of the estuary, and castor bean (*Ricinus communis*) and tick trefoil (*Desmodium incanum*) in the uplands directly mauka of the estuary. Finally, there is a single false kamani or Indian almond (*Terminalia catappa*), which was planted on the western side of the estuary to honor a late KOOH volunteer. For a complete list of plant species noted during fieldwork in 2022, see Table 1.

Table 1. Plant species noted during field surveys in 2022.

| Family | Scientific Name | Hawaiian Name | Common Name | Origin | Life Form | WRA Score |
|---|---|---|---|---|---|---|
| Poaceae | *Chloris barbata* | mauʻu lei | swollen fingergrass | non-native | grass | 20 (high risk) |
| Polygonaceae | *Coccoloba uvifera* | | sea grape | non-native | tree | 7 (high risk) |
| Arecaceae | *Cocos nucifera* | niu | coconut | Polynesian introduction | tree | |
| Poaceae | *Cynodon dactylon* | manienie | Bermuda grass | non-native | grass | 22 (high risk) |
| Poaceae | *Dactylotenium australe* | | crowfoot grass | non-native | grass | 6 (evaluate) |
| Fabaceae | *Desmodium incanum* | | tick trefoil | non-native | vine | 15 (high risk) |
| Poaceae | *Eleusine indica* | | wiregrass | non-native | grass | 24 (high risk) |
| Moraceae | *Ficus benghalensis* | | Indian banyan | non-native | tree | 3 (low risk) |
| Moraceae | *Ficus microcarpa* | | banyan | non-native | tree | 10 (high risk) |
| Cyperaceae | *Fimbristylis cymosa* | maʻu akiʻaki | button fimbristylis | indigenous | sedge | |
| Malvaceae | *Hibiscus rosa-sinensis* | | Chinese hibiscus | non-native | shrub | -2 (low risk) |
| Convolvulaceae | *Ipomoea obscura* | | obscure morning glory | non-native | vine | 13 (high risk) |
| Fabaceae | *Leucaena leucocephala* | ekoa | koa haole | non-native | tree | 15 (high risk) |
| Solanaceae | *Lycium sandwicense* | ʻohelo kai | | indigenous | herb | |
| Poaceae | *Megathyrsus maximus* | | Guinea grass | non-native | grass | 17 (high risk) |
| Pandanaceae | *Pandanus tectoris* | hala | screwpine | Polynesian introduction | tree | |
| Poaceae | *Paspalum vaginatum* | | seashore paspalum | non-native | grass | 7 (high risk) |
| Fabaceae | *Pithecellobium dulce* | ʻopiuma | Manila tamarind | non-native | tree | 14 (high risk) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Asteraceae | *Pluchea carolinensis* | | sourbush | non-native | tree | 16 |
| Portulacaceae | *Portulaca pilosa* | | portulaca | non-native | herb | 23 (high risk) |
| Fabaceae | *Prosopis pallida* | kiawe | mesquite | non-native | tree | 10 (high risk) |
| Euphorbiaceae | *Ricinus communis* | | castor bean | non-native | shrub | 21 (high risk) |
| Fabaceae | *Samanea saman* | | monkey pod | non-native | tree | 4 (low risk) |
| Goodeniaceae | *Scaevola taccada* | naupaka kahakai | beach naupaka | indigenous | shrub | |
| Anacardiaceae | *Schinus terebinthifolius* | | Christmas berry | non-native | tree | 19 (high risk) |
| Cyperaceae | *Schoenoplectus tabernaemontani* | nānaku | giant bulrush | indigenous | sedge | |
| Aizoaceae | *Sesuvium portulacastrum* | ʻakulikuli | sea purslane | indigenous | herb | |
| Poaceae | *Sporobolus virginicus* | ʻakiʻaki | seashore rushgrass | indigenous | grass | |
| Myrtaceae | *Syzygium cumini* | | Java plum | non-native | tree | 9 (high risk) |
| Combretaceae | *Terminalia catappa* | false kamani | Indian almond | non-native | tree | 4 (low risk) |
| Malvaceae | *Thespesia populnea* | milo | Pacific rosewood | Polynesian introduction | tree | |
| Boraginaceae | *Tournefortia argentea* | | tree heliotrope | non-native | tree | 4 (low risk) |
| Poaceae | *Urochloa mutica* | | California grass | non-native | grass | |

*WRA Scores are defined by the Hawaiʻi-Pacific Weed Risk Assessment (H-P WRA), see https://plantpono.org.*

## 2.2 Fish and Wildlife

Loko o Honuʻapo provides habitat for a diversity of native and endemic fish and wildlife species. Full species lists are found in Appendix B of the 2011 Wetlands Habitat Restoration Plan for Honuʻapo Estuary, but are described herein below.

### *2.2.1 Terrestrial Mammals*

Terrestrial mammals found in the park area include introduced wild and feral species, including feral cats (*Felis catus*), pigs (*Sus scrofa*), goats (*Capra aegagrus hircus*), mongoose (*Herpestes javanicus*), mice (*Mus musculus*), and rats (*Rattus rattus*). There is at least one feral cat colony that is actively maintained by local residents and this is of particular concern for resident and migratory bird species (due to direct predation on birds or eggs), and the visiting Hawaiian monk

seals (due to indirect impacts from Toxoplasmosis infections that can be spread by cats). This area is also used frequently by local residents with dogs, though dogs are generally on leash and in control of the owner. Anecdotal evidence indicates that the federally listed endangered ʻōpeʻapeʻa or Hawaiian hoary bat or (*Lasiurus cinereus semotus*) may forage and roost in the vicinity of Honuʻapo (Corinna Pinzari-Mitchell, pers. comm.). This is worth mentioning as the nearby coastline provides habitat for maternity roosts from May to September, which in turn may dictate the months that massive tree trimming / removal should be avoided during restoration efforts.

### *2.2.2 Birds*

There are three native endemic waterbirds that are listed under the Endangered Species Act (ESA) that may be found at Honuʻapo estuary: aeʻo (Hawaiian stilts, *Himantopus mexicanus knudseni)*, ʻalae keʻokeʻo *(*Hawaiian coot, *Fulica alai)*, and kōloa moali (Hawaiian duck, *Anas wyvilliana*). Several migratory waterbirds, protected under the Migratory Bird Treaty Act (MBTA) and North American Wetland Conservation Act (NAWCA), may utilize either the land or marine environments near the estuary. These include hunakai (sanderling, *Calidris alba*), kioea (bristle-thighed curlew, *Numenius tahitiensis*) and ʻulili (wandering tattler, *Tringa incana*), and all three species were included in a 2009 U.S. Fish and Wildlife (USFWS) proposal composed by Kimberly Uyehara for Honuʻapo (pers. comm., *see* Lamson 2010). Kioea and ʻulili are designated by USFWS as Birds of Conservation Concern (BCC, USFWS 2021). Other non-wetland species included in the 2021 BCC update that may be found at Honuʻapo include the pueo (*Asio flammeus sandwichensis*, Hawaiian short-eared owl), the iʻo (*Buteo solitarius*, Hawaiian hawk), the iwa (*Fregata minor palmerstoni*, great frigatebird), the noio (*Anous minutus melanogenys*, Black Noddy) (USFWS 2021). Additionally, state biologists have confirmed observations of ʻakekeke (ruddy turnstone, *Arenaria interpres*), kōlea (Pacific golden plover, *Pluvialis fulva*), an aeʻo (*H. mexicanus knudseni*), and another nine bird species, see Table 2 below.

KOOH volunteers have also routinely observed ʻulili utilizing the estuary and rocky shoreline, along with occasional threatened nēnē birds (Hawaiian goose, *Branta sandvicensis*) and the resident native ʻaukuʻu (black-crowned night heron, *Nycticorax nycticorax hoactli*) frequently noted around the estuary. The seabird noio or black noddy is also commonly seen in flocks flying in and out of refuges in the rocky coastal cliffs of the area to the south of the wharf. Koaʻe kea (white-tailed tropic bird, *Phaethon lepturus dorotheae*) and ʻio have also been observed at Honuʻapo (NPS 2006). Non-native birds found at Honuʻapo include the northern cardinal (*Cardinalis cardinalis*), Japanese white-eye (*Zosterops japonicus*), spotted dove (*Streptopelia chinensis*), zebra dove (*Geopelia striata*), the common barn owl (*Tyto alba*), and the occasional domestic duck (species unknown). There are no native forest birds found near the wetland or that are known to travel through the surrounding areas.

Hawai‘i Department of Land and Natural Resources DOFAW staff conducted 46 semi-annual surveys at Honu‘apo over the 33 year period between 1986 and 2019. These surveys generally took place in winter (January) and / or summer months (July or August) on one to two occasions annually, excluding four years where no surveys were conducted (average of 1.39 surveys per year). During this time, DOFAW biologists counted 237 individual birds of 12 species utilizing the habitat around Honu‘apo estuary (average of 5.15 birds per survey). The five most common birds observed during these surveys included the kōlea (104 individual birds counted in total during 20 surveys), ‘ulili (48 birds during 23 surveys), auku‘u (28 birds during 19 surveys), ‘akekeke (23 birds during 6 surveys), and nēne (18 birds during 2 surveys). See Table 2 for a full list and count of species observed during this period (DOFAW 2022).

In addition, avian biologist and founder of Birds of Hawai‘i Past Present, Bret Mossman, confirmed that there was a breeding pair of ae‘o or Hawaiian stilts nesting near Honu‘apo in 2022. This is one of only two current breeding pairs of ae‘o nesting on the eastern side of Hawai‘i Island (Bret Mossman, pers. comm.). As such, KOOH is supporting the plans initiated by Birds of Hawai‘i Past Present to initiate predator control activities around the estuary and breeding habitat this summer in order to encourage ae‘o and other listed species and migratory birds to more safely take residence within the estuary. These proposed control activities will utilize bird-safe designs to avoid any bycatch.

Table 2. Bird counts conducted at Honu‘apo by DOFAW from 1986 - 2019.

| Scientific name | Hawaiian name | Common name | Origin | Significance | Total individuals observed | Observations (N = 46) | Average count / observation |
|---|---|---|---|---|---|---|---|
| *Anas acuta* | koloa māpu | northern pintail | indigenous | migrant | 5 | 1 | 5 |
| *Anas clypeata* | koloa mohā | northern shoveler | indigenous | migrant | 3 | 1 | 3 |
| *Arenaria interpres* | ‘akekeke | ruddy turnstone | indigenous | migrant | 23 | 6 | 3.83 |
| *Branta sandvicensis* | nēnē | Hawaiian goose | endemic | threatened | 18 | 2 | 9 |
| *Himantopus mexicanus knudseni* | ae‘o | Hawaiian stilt | endemic | endangered, proposed for downlisting to threatened | 1 | 1 | 1 |
| No birds | | | | | 0 | 8 | 0 |
| *Nycticorax nycticorax hoactli* | auku‘u | black-crowned night-heron | indigenous | considered native but indistinguishable from North American species | 28 | 19 | 1.47 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Other Domestic Waterfowl* | | | introduced | | 2 | 1 | 2 |
| *Phaethon lepturus dorotheae* | koa‘e kea | white-tailed tropic bird | indigenous | migrant | 1 | 1 | 1 |
| *Pluvialis fulva* | kōlea | Pacific golden-plover | indigenous | migrant | 104 | 20 | 5.2 |
| *Tringa incana* | ‘ulili* | wandering tattler | indigenous | migrant, fomerly Heteroscelus incanus | 48 | 23 | 2.09 |
| *Tringa melanoleuca* | | greater yellowlegs | indigenous | migrant (rare) | 1 | 1 | 1 |
| *Unknown Sandpiper* | | | | | 3 | 1 | 3 |
| **Total bird counts** | | | | | **237** | **46** | **5.15** |

**USFWS Bird of Conservation Concern in the Hawai‘i region (BCR 67) (USFWS 2021) and a priority species for North Americans Wetland Conservation Act (NAWCA).*

### *2.2.3 Aquatic Species*

The estuary provides important spawning and nursery habitat for a large number of native fishes. A reef area located at the mouth of the estuary is naturally protected by a breakwall of pāhoehoe lava and provides prime habitat for juvenile fishes and other marine life (Lamson 2010). During graduate research conducted over 13 months between 2008 – 2009, Lamson (2010) documented 129 fish species using the Honu‘apo nearshore coral reef and tide-pool areas. In particular, she recorded five estuarine fishes occasionally utilizing the transect closest to the estuary channel, kākū (barracuda, *Syphraena* spp.), āholehole (*Kuhlia* spp.), ‘ōmilu (bluefin trevally, *Caranx melampygus*), weke ‘ula (yellowfin goatfish, *Mulloidicthys vanicolensis*), and ama ‘ama (striped mullet, *Mugil cephalus*) (Lamson 2010).

Local residents recall that the estuary used to provide good habitat for pāpio (juvenile trevally, ulua, *Caranx ignobilis*). Native fish species that have been recorded in Honu‘apo estuary include the endemic āholehole (Hawaiian flagtail, *Kuhlia xenura*), ‘ama‘ama (striped mullet, *Mugil cephalus*), halfspot gopy (*Asterropteryx semipunctatus*), Hawaiian shrimp goby (*Psilogobius mainlandi*), the threatened ‘ō‘opu naniha goby (*Stenogobius hawaiiensis*), ohua (juvenile manini, convict tang, *Acanthurus triostegus*), the endemic ‘ō‘opu akupa (*Eleotris sandwicensis*), weke‘a (yellowstripe goatfish, *Mulloidichthys flavolineatus*) and weke‘ula (yellowfin goatfish, *Mulloidichthys vanicolensis*). Invasive fishes include livebearers (mosquitofish, *Gambusia affinis*, and guppies, *Poecilia* spp.) and introduced kanda mullet (*Osteomugil engeli*), and may also include small amounts of tilapia (*Oreochromis* spp.) and introduced snappers (*Lutjanus fulvus*).

Additionally, DLNR's Division of Aquatic Resources (DAR) staff conducted quarterly estuary sampling surveys between December 7, 2006 to June 13, 2007. DAR biologists observed 19 different fish species, plus a single native crustacean ʻōpae huna (feeble shrimp, *Palaemon debilis*) and an introduced mollusc (red-rim melania, *Melanoides tuberculata*) across the four sampling sites within the Honuʻapo estuary during four morning surveys. See Table 3 below for the full species list and counts that were extracted from their sampling report (DAR 2008). The five most common fish species observed during these surveys included invasive guppies (*Poecilia* spp., 1,078 fish counted and sized), invasive kanda mullet (*Osteomugil engeli*, 98 fish), the endemic āholehole (Hawaiian flagtails, *Kuhlia xenura*, 70 fish), the endemic Hawaiian sleeper goby (*Eleotris sandwicensis*, 9 fish), and the indigenous manini (convict tang, *Acanthurus triostegus*, 6 fish).

According to research conducted by Drs. Richard Mackenzie and Gregory Bruland (2012), Honuʻapo estuary was one of only five wetlands statewide (out of 20) surveyed between March 2007 and December 2008 that was dominated by native species of fish and invertebrates. However, this scenario changed beginning in June 2008 when their lift / seine net samples revealed an increase in exotic *Poecilia* spp (Mackenzie and Bruland 2012). Notably, Lamson (2010) never recorded any *Poecilia* spp. or *Gambusia affinis* (guppies or mosquitofishes) within the transects of her nearshore marine surveys (N = 577), as these species are typically restricted to more fresh or estuarine habitats.

Concurrently, DAR biologists collected water quality and physical characteristic data of the estuarine habitat and the summary statistics are shared here. They described the area as a natural, coastal embayment, and the benthic habitat of the four estuary sampling sites as composed mostly of sediment (64%) and boulders (27%), with a limited amount of bedrock (4%), gravel (3%), detritus (2%), and sand (0%). The average dissolved oxygen they recorded for this location was 7.36 ± 0.42 mg/L, average pH was 7.67 ± 0.33, average salinity was 12.67 ± 7.89 ppt (with a broad range between 3.65 ppt and 27.67 ppt), average conductivity of 20.84 ± 12.02 ms/cm, average temperature of 23.56 ± 1.68 ˚C, and average turbidity value of 16.99 ± 15.99 NTU (where the standard deviation of the average is also presented in the aforementioned figures, N = 16).

Mackenzie and Bruland (2012) noted similar water quality parameters during their later surveys, with an average salinity of 14.9 ± 2.9 ppt, dissolved oxygen of 6.6 ± 0.5 mg/L, and temperature of 23.9 ± 0.5 ˚C, and any differences may be attributable to the specific survey sites or times. In addition, they noted the benthos habitat as "silt" as opposed to other wetlands they categorized as "sand" or "muck" or "rock" (Mackenzie and Bruland 2012).

Table 3. Fish and invertebrate species observed at Honuʻapo by DAR from 2006 to 2007.

| Family | Scientific Name | Hawaiian Name | Common Name | Origin | Life Form | # of Animals |
|---|---|---|---|---|---|---|
| Pomacentridae | *Abudefduf abdominalis* | mamo | Hawaiian sergeant | endemic | fish | 1 |
| Acanthuridae | *Acanthurus triostegus* | manini | convict surgeonfish | indigenous | fish | 6 |
| Carangidae | *Caranx melampygus* | ʻōmilu | bluefin trevally | indigenous | fish | 1 |
| Chaetodontidae | *Chaetodon lunula* | kīkakapu | raccoon butterflyfish | indigenous | fish | 1 |
| Eleotridae | *Eleotris sandwicensis* | ʻōʻopu akupa | sandwich island sleeper | endemic | fish | 9 |
| Apogonidae | *Foa brachygramma* | | bay cardinalfish | endemic | fish | 1 |
| Gobiidae | *Gnatholepis anjerensis* | | eye-bar goby | indigenous | fish | 2 |
| Kuhliidae | *Kuhlia sandwicensis* | āholehole | flagtail | indigenous | fish | 2 |
| Kuhliidae | *Kuhlia xenura* | āholehole | Hawaiian flagtail | endemic | fish | 70 |
| Lutjanidae | *Lutjanus fulvus* | toʻau | blacktail snapper | non-native | fish | 1 |
| Thiaridae | *Melanoides tuberculata* | | Malaysian trumpet snail | non-native | mollusk | 95 |
| Mullidae | *Mulloidichthys flavolineatus* | wekeʻā | yellowstripe goatfish | indigenous | fish | 17 |
| Mugilidae | *Osteomugil engeli* | | mullet | non-native | fish | 98 |
| Palaemonidae | *Palaemon debilis* | ʻopae huna | feeble shrimp | indigenous | crustacean | 214 |
| Poeciliidae | *Poecilia* spp. | | guppy | non-native | fish | 1078 |
| Polynemidae | *Polydactylus sexfilis* | moi | sixfeeler threadfin | indigenous | fish | 1 |
| Carangidae | *Scomberoides lysan* | lai | doublespotted queenfish | indigenous | fish | 1 |
| Oxudercidae | *Stenogobius hawaiiensis* | ʻōʻopu naniha | naniha goby | endemic | fish | 1 |
| Labridae | *Stethojulis balteata* | ʻomaka | belted wrasse | indigenous | fish | 1 |
| Labridae | *Thalassoma duperrey* | hīnalea lauwili | saddle wrasse | endemic | fish | 1 |
| Zanclidae | *Zanclus cornutus* | kihikihi | moorish idol | indigenous | fish | 2 |

The following estuarine fauna were recorded at Honuʻapo by Dr. Greg Bruland and Dr. Rich MacKenzie for an Environmental Protection Agency wetland research study. They surveyed nekton in the Honuʻapo estuary using lift and seine nets September 2007 – September 2008, and it was later included in a larger statewide publication (Mackenzie and Bruland 2012).

The following species of fish and crustaceans from their survey effort at Honuʻapo is listed below with permission in Table 4.

Table 4. Crustacean and fish species recorded at Honuʻapo estuary from 2007 – 2008 (from Mackenzie and Bruland 2012).

| Family | Scientific Name | Origin | Life Form |
|---|---|---|---|
| Apheidae | *Alpheus* sp. | indigenous | crustaceans |
| Eleotridae | *Eleotris sandwicensis* | endemic | fish |
| Grapsidae | *Grapsus* sp. | indigenous | crustaceans |
| Kuhlidae | *Kuhlia xenura* | endemic | fish |
| Kuhlidae | *Kuhlia sandwicensis* | indigenous | fish |
| Mulloidichthys | *Mulloidicthys vanicolensis* | endemic | fish |
| Palaeomonidae | *Palaemon debilis* | indigenous | crustaceans |
| Poeciliidae | *Poecilia* hybrid sp. | non-native | fish |
| Gobiidae | *Psilogobius mainlandi* | indigenous | fish |
| Gobiidae | unknown | indigenous | fish |
| Diodontidae | unknown | indigenous | fish |

Recorded crustaceans include snapping shrimp (*Alpheus* sp.), ʻōpae huna (feeble shrimp, *Palaemon debilis*) and aʻama (thin-shelled rock crab, *Grapsus tenuicrustatus*). Native molluscs include nahawale liʻi liʻi (Hawaiian muscle, *Brachidontes crebistriatus*). The threatened honu (green sea turtle, *Chelonia mydas*) is also known to frequent Honuʻapo Estuary and the name of the area has been translated to both "turtle poking its head above the water" or "caught turtle". In addition, the critically-endangered honuʻea (hawksbill sea turtle, *Eretmochelys imbricata*) has been recorded in Honuʻapo Bay, and nearby nesting sites include Kamehame, Punaluʻu, Nīnole, and Kāwā. The endangered ʻilio holo i ka uaua or nā mea hulu (Hawaiian monk seal, *Neomonachus schauinslandi*) is also occasionally observed utilizing the bay and the beach near the estuary, including most recently in May 2021 (see here for the story).

*2.2.4 Insects*

The endangered, endemic orange-black Hawaiian damselfly (pinao, *Megalagrion xanthomelas*), has been seen at Honuʻapo Estuary near freshwater seeps. Other insects include a wide variety of introduced dragonflies, and both native and non-native moths, beetles, and bees. Nearby coastal regions have also confirmed the presence of another endangered and endemic insect, nalo meli maoli (Hawaiian yellowface bee, *Hylaeus* spp.), so it is likely that this species is also an inhabitant of Honuʻapo and using some of the resident flora for nectar and driftwood to bore holes for their homes.

*2.2.5 Updates to Fish & Wildlife Surveys in 2022*

Little has changed with the fauna of Honuʻapo estuary since the previous ecological survey was conducted over a decade ago. Most of the species listed above were already noted in the past surveys, however, this 2022 update includes a more thorough presentation of several past studies (Lamson 2010, Mackenzie and Bruland 2012) and new data from DAR (2006 – 2007 – not included in the previous report) and DOFAW (1986 – 2019, the previous report only included 1990 – 1995 bird counts). In addition, the previous SGRII 2011 work noted that, "there are, to date, no scientifically-verified sightings of listed endangered plants anywhere in the project area." However, this 2022 update includes verified confirmation and citations for the following noted T&E species, and updates the species status and Latin names, where relevant.

*2.2.6 Threatened and Endangered Species Observations*

Past confirmed and listed ESA species that had been observed, as extracted from the Wetlands Habitat Restoration Plan for Honuʻapo Estuary (SRGII 2011):

- the endangered pinao (orange-black Hawaiian damselfly, *Megalagrion xanthomelas*)
- the threatened ʻōʻopu naniha (Naniha goby, *Stenogobius hawaiiensis*)
- the threatened ʻio (Hawaiian hawk, *Buteo solitarius*)

*2.2.7 Protected Species Update for 2022:*

Threatened nēnē were observed in a flock of five during one of the KOOH loko iʻa workdays at Honuʻapo in late 2021, in addition this species was also seen on two other occasions in flocks of nine in 2016 (DOFAW 2022). The endangered aeʻo was reported to be nesting at a nearby water source in the area and biologists believe that Honuʻapo would be a viable habitat for breeding stilts in future years. In addition, a solitary aeʻo was observed on August 20, 2014 during the

statewide waterbird count (DOFAW 2022). In 2021, the Hawaiian stilt population was proposed for downlisting by USFWS from endangered to threatened.

Threatened honu (green sea turtles) were frequently observed passing into and out of the estuary, and were seen in at least half of the fieldwork activities from this report spanning from March 2021 to May 2022, including two incidents where honu were entangled with monofilament fishing line and had to be cut free (one from active fishing gear on July 31, 2021 from around the estuary channel, and a second one with derelict gear wrapped around it's flipper on September 4, 2021). One of the top two nesting beaches statewide for the endangered honuʻea (hawksbill sea turtle) is located just to the northeast and upstream with the prevailing Halaʻea current so the nearshore area at Honuʻapo may also likely be an important foraging or breeding habitat for this species.

Additionally, a female Hawaiian monk seal (tag #R8HE) was observed using the tidepools in front of the estuary channel on May 22, 2021 by KOOH Board member, Jodie Rosam, and was reported to and confirmed with The Marine Mammal Center's Ke Kai Ola staff (KOOH 2021). Monk seals have been observed on occasion at Honuʻapo including inside the estuary as early as 2004. See link above in 2.2.3 Aquatic Species.

### *2.2.8 Potential Impacts & Suggested Mitigation Measures for Proposed Restoration Activities*

Any restoration project has the potential to harm the very native species that it is intended to be protecting. The proposed Honuʻapo Estuary Wetland Restoration project and Phase 1 activities will ultimately benefit the native flora, fauna, and coastal and aquatic habitats in the area, but some individuals may be negatively impacted during the scope of the work. Currently, the biggest direct threats to protected species in the area are: 1) the presence of marine debris for aquatic species, and 2) land-based predators including cats, rats, mice and mongoose for bird and bat species. Light pollution can also impact fledgling sea birds and nesting sea turtles (and hatchlings). KOOH and HWF currently conduct routine shoreline beach cleanups at Honuʻapo and are looking into installing a monofilament fishing line recycling bin to increase proper disposal of hooks and lines. While the first phase of the project does not include predator control or fencing, these are two viable options for protecting native bird and bat species at Honuʻapo in the future. KOOH is also supportive of proposed predator control efforts by Hawaiʻi Birds Past Present. Potential impacts from proposed restoration activities (including but not limited to sediment and silt removal, tree and vegetation removal, and other land clearing efforts) can be mitigated to reduce potential harm, especially to the above listed and confirmed protected species utilizing the area.

Prior to any work inside the estuary, all equipment, protective gear and shoes (e.g., felt tabies) should be decontaminated and checked for any dirt, mud or seeds to limit the spread of any new potential invasive species. Recommendations include rinsing all heavy equipment and smaller hand tools with a high-pressure hose or washer before and after field activities, and drying all equipment and supplies before bringing them to the restoration site. In addition, tabies that have previously been used at any other location should be cleaned and rinsed in a 10% diluted bleach

solution, and thoroughly dried prior to using them at Honuʻapo. It would also be best to transit within Honuʻapo Park with other shoes (and not tabies) as there are plenty of weed seeds of different varieties in other sections of the property, and don tabies only when at the estuary.

Volunteers, contractors and staff working in the area will be asked to refrain from using any chemical-based sunscreen or personal care products on skin surfaces that may be exposed to mud flats or estuarine waters. Likewise, all gloves will be cleaned and dried or new prior to use in the wetland. Volunteers will be briefed on these requests prior to conducting any restoration activities.

To mitigate any potential negative impacts to wildlife, it is recommended that a 15 - 30 minute survey is conducted at the proposed restoration area and within the surrounding 500 feet radius prior to beginning work to ensure that no ESA species are present (e.g., pinao at seeps / freshwater springs, honu swimming or basking in / around the estuary, monk seals swimming in / hauled out around the estuary, or protected bird species, including nēnē, ʻūlili, aeʻo or kioea, utilizing the area where restoration is planned for the day). If a protected species is present, restoration activities will be shifted to another area or activities will be delayed until the native species departs. All restoration work will be conducted during daylight hours and no additional lighting tools will be used (to prevent any disorientation by wildlife) after sunset or before sunrise. If biological surveys are conducted prior to dawn or after dusk, only red-light headlamps will be used.

Suggested guidelines based on USFWS and NOAA recommendations *if* protected species are present, include keeping a proper distance away from wildlife:

- At least 100 ft away from any sea turtles (honu or honuʻea)
- At least 150 ft away from any monk seal (or 300 ft if there is a seal with pup)
- At least 300 ft away from any bird species or bat

Protected bird and bat species will be assessed on a case-by-case basis, and KOOH or other partners will contact DLNR / DOFAW avian specialists prior to proceeding.

Furthermore, KOOH plans to work with Hawaiʻi Birds Past Present to identify any aeʻo nests in the region, and work away from these sites as needed. According to USFWS, the Hawaiian stilt "nesting season normally extends from mid-February through August, but varies among years" (USFWS 2022). However, according to DLNR, "nesting occurs between March and August and peaks in May and June" (DLNR 2015). Silt, sediment, or vegetation removal will not be conducted around any known aeʻo nest.

We will connect with USGS bat scientists to determine if any ʻōpeʻapeʻa bats are present prior to any large-scale tree removal efforts (with heavy equipment) planned during their May to September roosting season. Otherwise, large tree removal efforts should only take place between October and February each year in order to avoid the nesting / roosting seasons of the Hawaiian stilts and Hawaiian bat populations in the region.

The native nalo meli maoli or Hawaiian yellow-faced bees in the genus *Hylaeus* (Hymenoptera: Colletidae) are adapted to a wide array of habitat types, one of which is coastal strand. They tend

to nest in hollow stems, holes in trees, under tree bark or in crevices, or in burrows in the soil (https://dlnr.hawaii.gov/ecosystems/hip/species/nalo-meli-maoli/). As an extra precaution, we will advise all volunteers, staff, or residents using the shoreline not to collect any driftwood or disturb native vegetation along the shoreline (where native yellow-faced bees may reside).

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## 4.0 Selected Photos

*Figure 1: Monk seal R8HE resting in Honu‘apo shallows (May 2021). PC: KOOH.*

*Figure 2: Field reconnaissance for this 2022 biological survey update by KOOH Board members. Note the mixture of native ʻaki ʻaki (L side) and invasive seashore paspalum (R side) grasses in this photo around where the two surveyors are walking. PC: KOOH.*

*Figure 3: View of the native nānaku sedge at the south edge of the estuary, with a background of milo, kiawe, and niu. PC: KOOH.*

*Figure 4: View of the wetland edges and mud flats, sites of freshwater springs, and Cladophora limu at the south end of the estuary. PC: KOOH.*

*Figure 5: View of one of the inlets at the north end of the estuary with old concrete posts and more Cladophora limu visible at low tide, plus an assortment of mostly non-native trees in the backdrop. PC: KOOH.*

*Figure 6: Another inlet to the northern back side of the estuary (behind the bridge structure) with native ʻaki ʻaki in the forefront and kiawe, milo and niu in the background. Also pictured is the mud flats / sediment at low tide, plus limu and guppies present in the shallow waterways. PC: KOOH.*

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# APPENDIX F

Draft Archaeological Literature Review

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KA-069-031325

# DRAFT

# ARCHAEOLOGICAL LITERATURE REVIEW

# HONUʻAPO ESTUARY WETLAND RESTORATION PROJECT

# TMK: (3) 9-5-014:007 POR.

# HONUʻAPO AHUPUAʻA

# KAʻŪ DISTRICT

# ISLAND OF HAWAIʻI


KULAIWI ARCHAEOLOGY, LLC

**Archaeological, Cultural, and Historical Resource Management Services**

P.O. Box 1213, Captain Cook, HI 96704

Phone: 808-493-8884

KA-069-031325

# DRAFT

# ARCHAEOLOGICAL LITERATURE REVIEW

# HONUʻAPO ESTUARY WETLAND RESTORATION PROJECT

# TMK: (3) 9-5-014:007 POR.

# HONUʻAPO AHUPUAʻA

# KAʻŪ DISTRICT

# ISLAND OF HAWAIʻI


Prepared by:

Solomon H. Kailihiwa III, M.S.,
Juliana Kailihiwa, B.A.,
and
Dave Henry, B.S.


Prepared for:

Emi Tanitomi
Bow Engineering & Development, Inc.
1953 S. Beretania Street, PH-A
Honolulu, HI 96826

March 2025


KULAIWI ARCHAEOLOGY, LLC
**Archaeological, Cultural, and Historical Resource Management Services**
P.O. Box 1213, Captain Cook, HI 96704
Phone: 808-493-8884

# MANAGEMENT SUMMARY

At the request of Ms. Emi Tanitomi of Bow Engineering, Kulaiwi Archaeology, LLC has completed an archaeological literature review in association with the Honuʻapo Estuary Wetland Restoration Project, an approximately 18.25-acre portion of the 145.021-acre Honuʻapo Park located within Honuʻapo Ahupuaʻa, Kaʻū District, Island of Hawaiʻi (TMK: [3] 9-5-014:007. This 18.25-acre area is designated as the Area of Potential Effect (APE). The project objective is compliance with current historic preservation review requirements of Section 106 of the National Historic Preservation Act of 1996 (NHPA) and of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD), contained within Hawaii Administrative Rules; Title 13, DLNR; Subtitle 13, State Historic Preservation Rules; Chapter 277, Rules Governing Standards for Archaeological Site Preservation and Development and Chapter 279 Rules Governing Standards for Archaeological Monitoring Studies and Reports.

As requested by the SHPD for Section 106 projects, a literature review has been conducted to identify any previously identified historic properties within 0.5 miles of the APE. One previously identified archaeological site is situated within the boundaries of the APE, consisting of State Inventory of Historic places (SIHP) Site 50-10-74-22353[1]. This site is a complex of eight features located within and around a fishpond situated inland from the northern end of Honuʻapo Bay, previously identified during an Archaeological Inventory Survey (AIS) conducted by Haun & Associates (Haun, Henry and Ayres 2004). The site has both historic and pre-contact elements consisting of a concrete slab (Feature A), two bridges (Features B and C), two water control gates (Features D and E), a set of concrete walls (Feature F), a mortared stone wall (Feature G), and the fishpond itself (Feature H).

The Feature H fishpond originated as a pre-contact aquaculture feature, and the walls and water control gates located within and adjacent to the fishpond were constructed historically as elements of this aquaculture system. The bridges and the concrete slab are interpreted as recreational facilities constructed and used by Hutchinson Sugar Plantation employees. The site is unaltered and in fair condition. It was assessed as significant as an excellent example of a site type (Criterion "c") and for its information content (Criterion "d") by Haun et al. (2004:86) and was recommended for preservation.

Excluding the previously discussed Site 22353, the research identified 57 sites with a total of 168 features located within 0.5 miles of the APE. These sites were identified during projects conducted by Haun et al. (2004), the Department of Anthropology at the Bernice P. Bishop Museum (BPBM; Ayres 1970), Archaeological Consultants of the Pacific (ACP; Guerriero, Gregg and Kennedy 2006b), Rechtman Consulting, LLC (RC; Clark, Ah Sam, Ketner and Rechtman 2013) and ASM Affiliates (ASM; Clark and Rechtman 2019).

The 57 sites consist of 13 complexes of features containing from two to 65 features and 44 single feature sites. Of the 57 sites, 16 were recommended for preservation, 33 were recommended for no further work, and eight were not assessed. The preservation sites consist of the remnants of the Kamalaʻi Heiau (Site 50-10-74-3853), four permanent habitation sites (Sites 50-10-74-22376, 50-10-74-22379, 50-10-74-22383 and 50-10-74-26924), two petroglyph sites (Sites 50-10-74-22377 and 50-10-74-22378), a burial site (Site 50-10-74-22380), a former historic cemetery (Site 50-10-74-24404), a complex of boundary and agricultural features (Site 50-10-74-24409), a complex of bait cups and salt pans (Site 50-10-74-26921), a monument marker (Site 50-10-74-26922), two temporary habitation sites (Sites 50-10-74-26923 and 50-10-74-26926), and two transportation features (Sites 50-10-74-26330 and 50-10-74-30751).

[1] Site listed on the State Inventory of Historic Places (SIHP). Site number is 5 digit sequential number by island 50 = State of Hawaiʻi, 10= Island of Hawaiʻi, 74= Nāʻālehu quadrangle, 22353= SIHP Site number

The 33 sites recommended for no further work consist of a complex of historic foundation wharf, transportation and erosion control features (Site 50-10-74-22352), 12 sites associated with historic ranching (Sites 50-10-74-22354, 50-10-74-22357, 50-10-74-22359, 50-10-74-22367, 50-10-74-22374, 50-10-74-24410, 50-10-74-30738, 50-10-74-30740, 50-10-74-30747, 50-10-74-30754, 50-10-74-30756 and 50-10-74-30757), four temporary habitation sites (Sites 50-10-74-22358, 50-10-74-22363, 50-10-74-22371 and 50-10-74-22382), three water transportation sites (Sites 50-10-74-22355, 50-10-74-22356, and 50-10-74-22360), seven agricultural features (Sites 50-10-74-22362, 50-10-74-22364, 50-10-74-22365, 50-10-74-22366, 50-10-74-22368, 50-10-74-22375 and 50-10-74-22381), five disposal sites (Sites 50-10-74-22361, 50-10-74-22369, 50-10-74-22370, 50-10-74-22372, and 50-10-74-22373), and one boundary site (Site 50-10-74-24412).

The eight remaining sites consist of agricultural planting areas that were initially identified by Ayres (1970) and subsequently relocated by Haun et al. (2004). These consist of Temporary Sites B13-18, B13-19, B13-20,B13- 21, B13-22, B13-23, B13-63 and B13-67. The latter study identified no evidence of modification and were not recorded or assigned SIHP site numbers.

The 168 features at the 57 sites are comprised of 65 basins, 18 enclosures, 18 walls, 10 modified outcrops, eight platforms, five concrete slabs, five artifacts scatters, five petroglyphs, five platforms, three modified outcrops, three terraces, two alignments, two caves/lava blisters, two concrete stone and metal structures, two concrete blocks, two monuments, two overhangs, and one each of the following: cattle guard, concrete box, concrete wall, electrical panel, flume, *heiau*, L-shape, modified depression, pipe stanchion, railroad grade, and railroad rail. Functionally, the 168 features consist of bait cups/salt pans (n=65), permanent habitation (24), agriculture (20), ranching (12), boundary (9), historic foundation (7), temporary habitation (6), disposal (5), rock art (5), water transportation (4), transportation (3), burial/probable burial (2), wharf (2), ceremonial (1), erosion control (1), former historic cemetery (1) and marker (1).

An additional 23 sites were previously identified within the Haun et al. (2004) AIS survey area by Ayres (1970) and Paul H. Rosendahl, Inc. Ph.D. (PHRI, Rosendahl 1986). However, these features were destroyed prior to 2004 by either a 1975 tsunami that inundated Honu'apo, or by modern agriculture and/or ranching and were not relocated by Haun et al. (2004). These consist of 21 sites identified by Ayres (1970; Temporary Sites B13-1, B13-14, B13-15, B13-16, B13-25, B13-28, B13-34, B13-38, B13-39, B13-40, B13-47, B13-52, B13-53, B13-56, B13-57, B13-58, B13-59, B13-60, B13-61, B13-62, and B13-64), and two sites identified by Rosendahl (1986; T-102 and T-103).

As stated above, the results of the literature review indicate that there are 58 sites located within or within 0.5-miles of the APE, 17 sites have been recommended for preservation. These consist of the Site 22353 located within the current APE, and 16 additional sites located outside the APE. Protective measures to ensure the preservation of the Site 22353 complex will be detailed in an Archaeological Site Preservation Plan (ASPP) currently in preparation by Kulaiwi Archaeology. The remaining 16 preservation sites within 0.5-miles of the APE will not be impacted by the proposed Honu'apo Estuary Wetland Restoration Project and will be avoided by all construction activity. To ensure no impacts to these sites occur, especially those immediately adjacent to the APE (Sites 3853, 26921 and 26922) provisions outlining their protection will be presented in an Archaeological Monitoring Plan, also in preparation by Kulaiwi Archaeology.

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# INTRODUCTION

At the request of Ms. Emi Tanitomi of Bow Engineering, Kulaiwi Archaeology, LLC has completed an archaeological literature review in association with the Honuʻapo Estuary Wetland Restoration Project, an approximately 18.25-acre portion of the 145.021 acre Honuʻapo Park located within Honuʻapo Ahupuaʻa, Kaʻū District, Island of Hawaiʻi (TMK: [3] 9-5-014:007; (**Figure 1** and **Figure 2**). This 18.25-acre area is designated as the Area of Potential Effect (APE). The project objective is compliance with current historic preservation review requirements of Section 106 of the National Historic Preservation Act of 1996 (NHPA) and of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD), contained within Hawaii Administrative Rules; Title 13, DLNR; Subtitle 13, State Historic Preservation Rules; Chapter 277, Rules Governing Standards for Archaeological Site Preservation and Development and Chapter 279 Rules Governing Standards for Archaeological Monitoring Studies and Reports.

The proposed project will receive federal funding and is therefore a federal undertaking as defined by 36 CFR Section 800.16(y); the project is subject to compliance with Section 106 of the National Historic preservation Act (NHPA).

## Project Description

Based on a description of the project obtained from the County of Hawaiʻi, the project's primary objective is the restoration and enhancement of the estuary to restore and enhance habitat form and function for the benefit of native plants and animals, with an emphasis on resident and migratory bird species. Secondary objectives include enhancing habitat for native fish and turtles; accommodating estimated sea level rise; improving aesthetics of the site; allowing for passive recreational and educational uses; and preserving cultural and historical values. The proposed restoration includes the following improvements:

- removal of invasive vegetation to improve water quality and quantity as well as habitat function
- creation of deepened water areas for improved habitat productivity and diversity
- revegetation with native plant species to provide natural site conditions for native endemic species
- installation of a predator proof fence
- pedestrian gate and walkway with viewing platforms

Ongoing predator control to protect the endangered endemic and migratory bird species using the wetland would continue in conjunction with the installation of a predator proof fence. As depicted in **Figure 3**, the topography of the intertidal zone would be graded to create two habitat types. The grading would include approximately 9,270 cubic yards of cut and 0.5 cubic yards of fill over a 2.23-acre area of the estuary. Forage habitat for use by wading birds would be created on the mudflat areas that are currently covered with ground cover. The ground surface in these areas would be lowered to finished elevations that will result in frequent inundation by high tides. These modifications would be expected to increase productivity of food sources used by wading birds and prevent recruitment of invasive plants back onto the mudflats. Deep water pools would also be created by grading. These pools, which would remain perennial during all tides and are fed by fresh and sea water, would be expected to be favorable to the Hawaiian coot and other diving and dabbling birds.

## Scope of Work

The scope of work for the archaeological literature review for the APE is as follows:

1. Conduct background review and research of existing archaeological sites situated in the APE, and within 0.5-miles of the APE; and

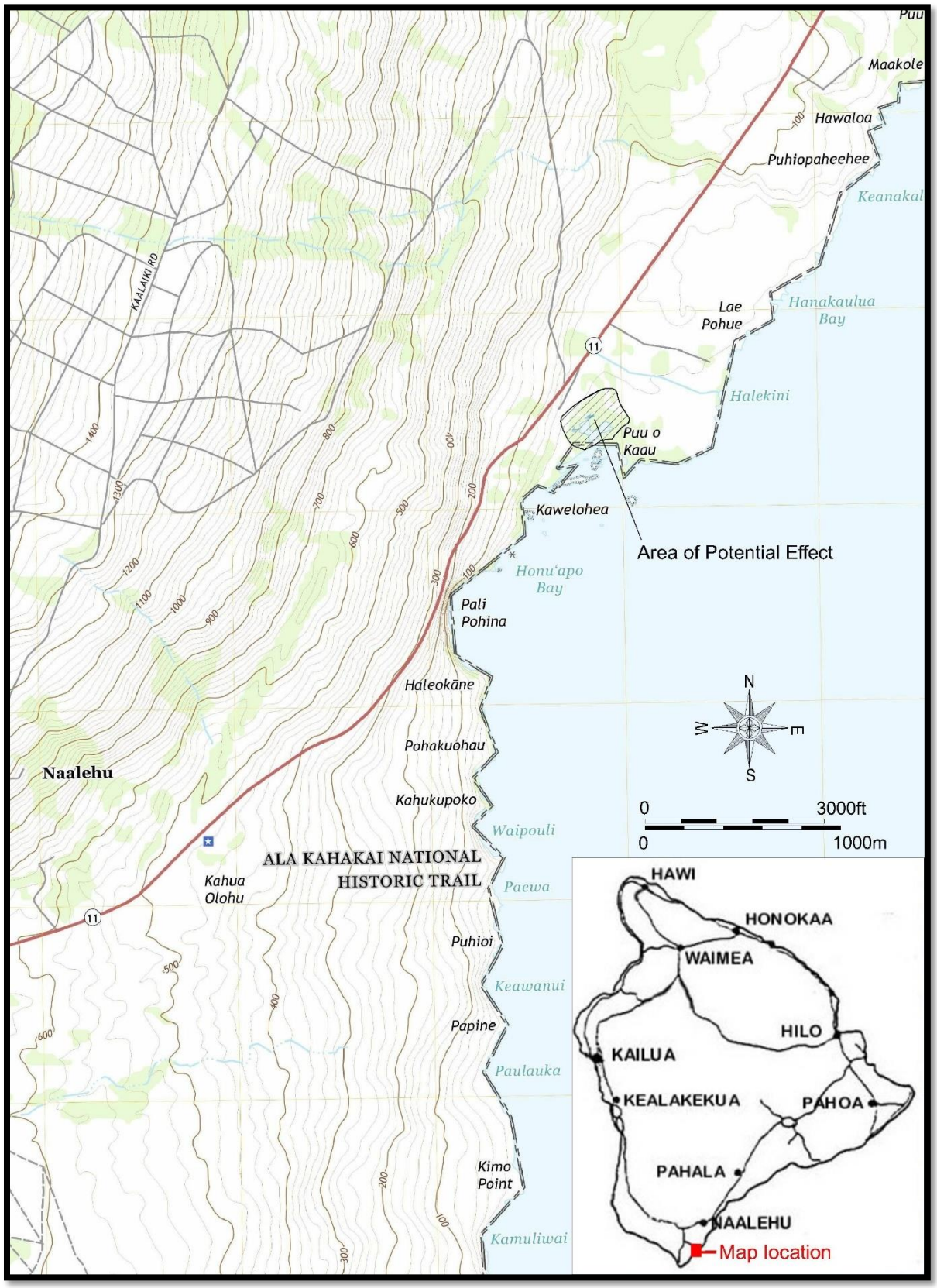


**Figure 1. Portion of 2017 7.5' USGS Naalehu quadrangle showing Area of Potential Effect (obtained from usgs.gov).**

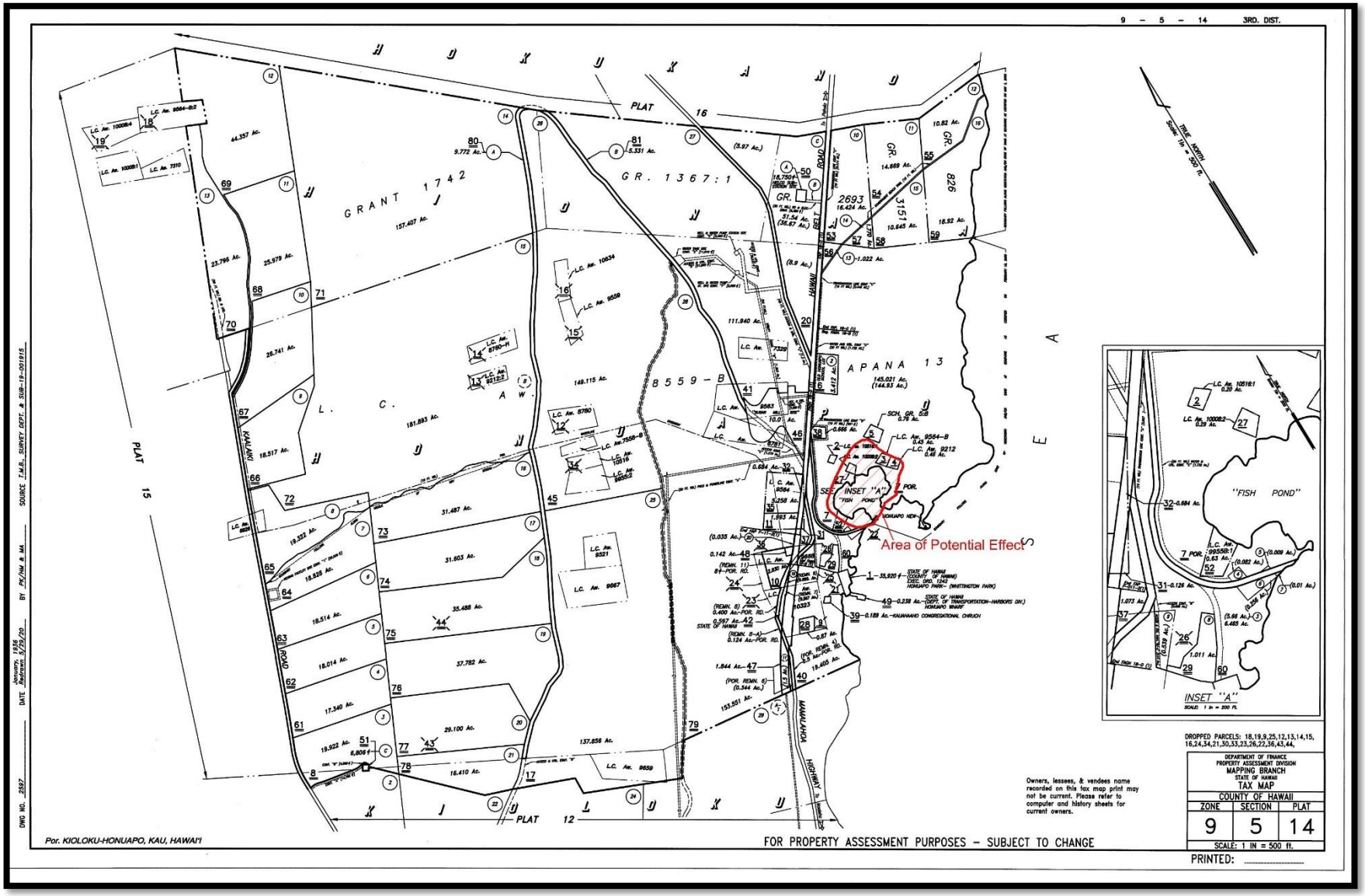


**Figure 2. Tax Map Key (3) 9-5-014:007 Por. dated May 29, 2020 showing Area of Potential Effect (obtained from hawaiicounty.gov).**

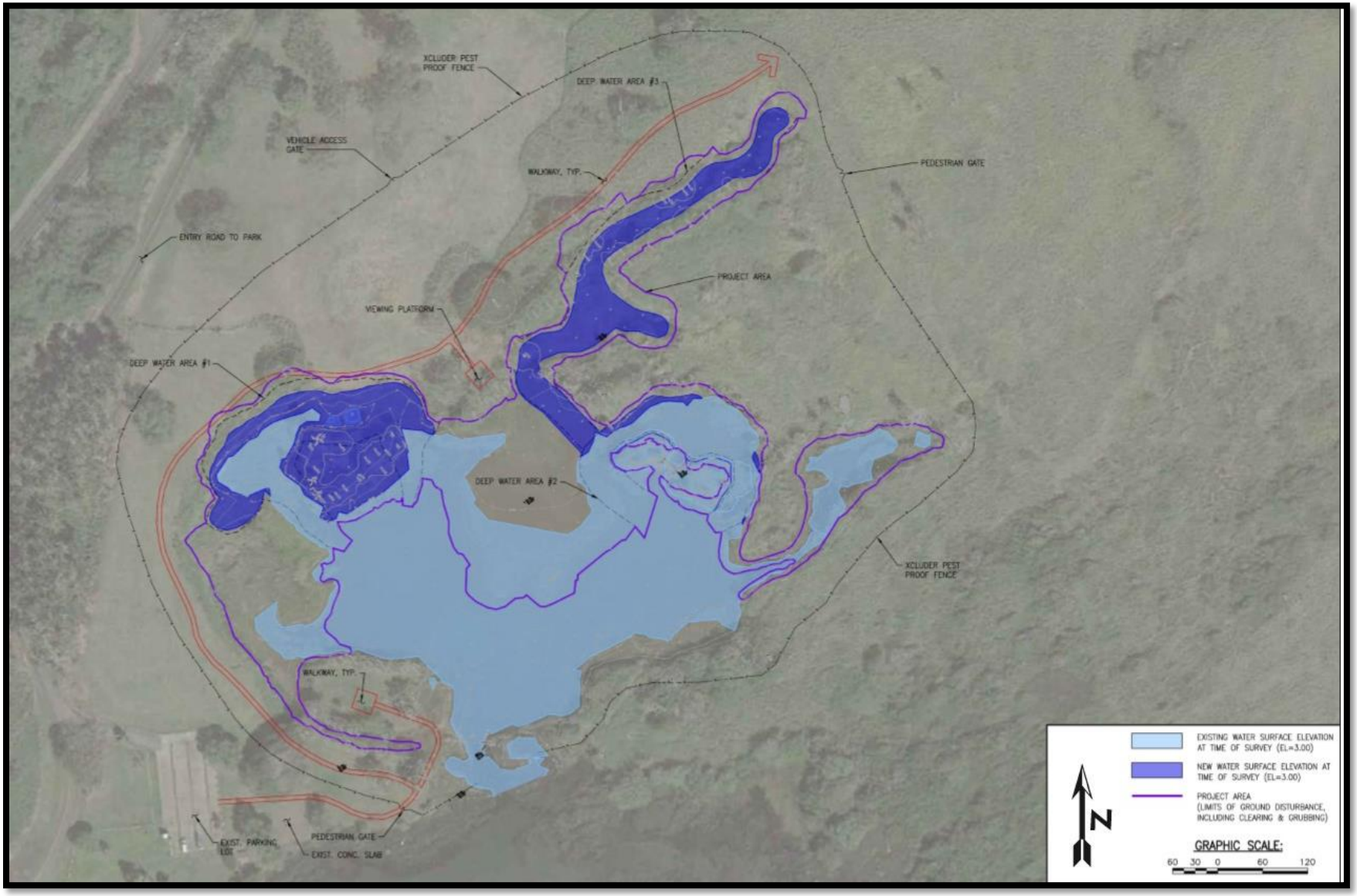


**Figure 3. General site plan of the Honu'apo Estuary Wetland Restoration Project.**

2. Prepare a final report that details the results of the literature review and limited field inspection, presenting recommendations for any additional archaeological work that may be required.

The APE is situated between Highway 11 and the shoreline at Honu'apo Bay, within Honu'apo Ahupua'a. Geologically, most of the *ahupua'a* is covered by lava and ash deposits that are more than 10,000 years old (Wolfe and Morris 1996). The youngest land surface is the coastal lowland, which is 3,000 to 5,000 years old. The soil within the area consists of rock land soil as defined by Sato et al. (1973). According to Sato et al., "Rock land is a miscellaneous land type that consists of pahoehoe lava bedrock covered in places by a thin layer of soil material" (1973:51). The mean annual rainfall in the APE vicinity ranges from 71 to 1350 mm (29 to 53 inches; Giambelluca et al. 2022) and the mean average temperature is approximately 79 degrees F (usclimatedata.com).

## Methods

Archival research was conducted at the Hamilton Library Hawai'i and Pacific Collection at the University of Hawai'i at Mānoa, the University of Hawai'i at Hilo Hawaiian Collection, the Land Survey Office and the Archives Division of the Hawai'i Department of Accounting and General Services, the Bishop Museum Archives, the State Historic Preservation Division library in Hilo, the Hawaii Cultural Resource Information System (HICRIS), the Hawai'i State Public Libraries in Honolulu and Hilo, and correspondence with the SHPD librarian.

## SITE 50-10-74-22353 WITHIN THE AREA OF POTENTIAL EFFECT

One archaeological site is located within the 18.25-acre APE. This consists of Site 50-10-74-22353, a complex of eight features documented during an Archaeological Inventory Survey (AIS) conducted by Haun & Associates (Haun et al. 2004). The site is located within an around the fishpond in the southern portion of the Haun et al. (2004) project area. The extent of the site is presented in **Figure 4**. The features include a concrete slab (Feature A), two bridges (Features B and C), two water control gates (Features D and E), a set of concrete walls (Feature F), a mortared stone wall (Feature G), and the fishpond itself (Feature H). The fishpond was initially identified by Ayres (1970), with all eight features subsequently documented by Haun et al. (2004). The features of the site are described by Haun et al. (2004) as follows:

**Feature A**

Feature A is a concrete slab situated adjacent to the northeastern end of the fishpond in a level grassy area that has been disturbed by cattle grazing. The slab is rectangular in shape and is built on a foundation of stacked and mortared pahoehoe cobbles and small boulders. The slab measures 6.8 m in length (north northwest to south southeast), 4.1 m in width, and 0.1 m in thickness (**Figure 5**). The stone foundation ranges in height from 0.25 m on the western side to 0.71 m tall on the western side. No cultural remains were observed. This slab potentially functioned as the foundation for a gazebo or picnic shelter for the employees of the nearby sugar mill based on its formal type and its location near the two decorative bridges discussed below.

**Feature B**

Feature B is a formed concrete footbridge that spans two small, possibly man-made islands at the northern end of the fishpond. The bridge is 6.3 m in length (northwest/southeast) 0.95 m in width and 0.22 in thickness (**Figure 6**). The top of the bridge is level in the center with curved ends that slope down to a stone abutment on each side. These abutments are constructed of stacked basalt stones that have been mortared together. The abutments vary in length from 1.7 to 3.1 m, in width from 0.35 to 0.56 m, and in height from 0.75 to 1.1 m.

A displaced decorative Japanese concrete lantern is located in the fishpond, c. 15 m north-northeast of the bridge. Only a portion of the lantern is visible above the water. The top of the lantern resembles an arched Japanese roof measuring 0.6 m in diameter by 0.45 m tall. The lantern is situated on a 0.25 m square concrete base that is at least 0.65 m long. The bridge was used for pedestrian access between the two islands. Its condition and close proximity to the decorative lantern suggests that these islands, which are probably artificial, and the Feature B and C bridges were used as recreational facilities by employees of the sugar mill.

**Feature C**

Feature C consists of a series of preformed, concrete steppingstones that extend between the shore and a small island located within the fishpond. The feature is located at the northern end of the fishpond. There are five intact steppingstones and two displaced ones (**Figure 7**). A set of formed concrete stairs are located at each end of the row of steppingstones, one on the shore and one on the island. These stairs are 0.65 m long, 0.45 m wide, and 0.15 m in height. The steppingstones measure 0.58 m in diameter and extend 0.3 m in height above the waterline. The displaced steppingstones are 1.2 m in length. The upper surface of the steppingstones is paved with smooth basalt stones imbedded in the surface. There is a decorative concrete column lying in the water adjacent to the stairs on the island side of the site. This column is 1.3 m long, 0.35 m

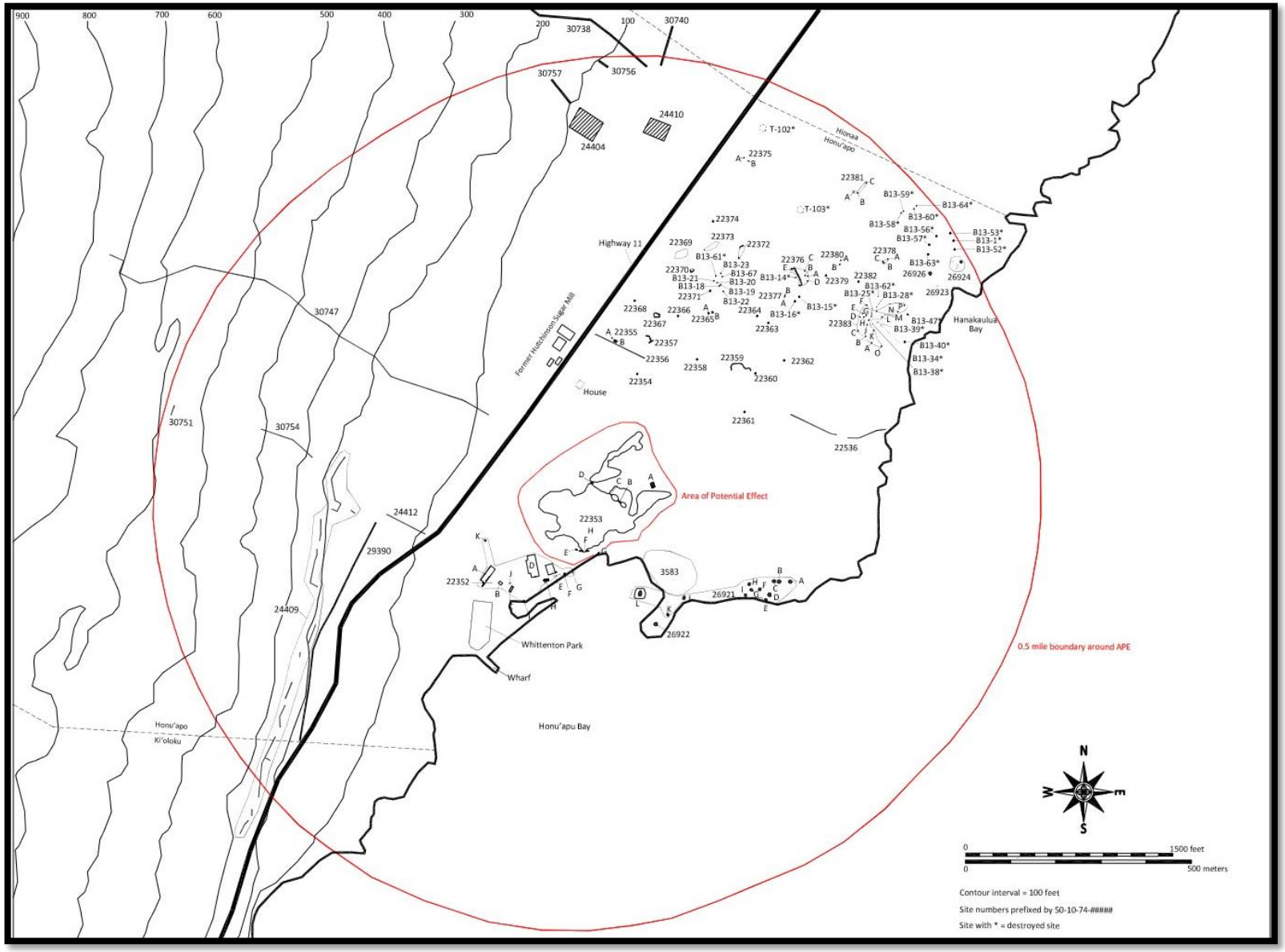


**Figure 4. Location of Site 22353 within APE and sites within 0.5-miles of APE.**

**Figure 5. Site 22353, Feature A concrete slab (view to south-southwest; from Haun et al. 2004:37).**

**Figure 6. Site 22353, Feature B concrete footbridge (view to west; from Haun et al. 2004:37).**

**Figure 7. Site 22353, Feature B concrete steppingstones (view to south; from Haun et al. 2004:39).**

square at the base, and tapers to 0.25 m square at the top. The bridge provided pedestrian access to the island from the shore.

**Feature D**

Feature D is a water control gate located in a narrow passage at the northern end of the fishpond, between the main pond and a lode of the pond that extends to the northeast. It is comprised of two concrete blocks situated on each side of the passage (**Figure 8**). These blocks are 0.18 m square by 0.4 m tall, and each has with a vertical groove that is 0.05 m wide and 0.04 m deep. These two grooves face each other and likely once supported a piece of wood or metal that would be used to control the flow of water into the pond. Stacked and mortared stone walls extend to the north-northeast from each concrete block, on the sides of the narrow passage. The western wall is 4.7 m long and the eastern wall is 3.0 m long. These walls are 0.35 m wide and 0.4 m tall.

**Feature E**

Feature E is a water control gate situated in a small, dry streambed, c. 14 m west of the main entrance to the fishpond. The feature consists of a concrete block and stone wall on the western side of the stream bed and a stacked and mortared stone block on the eastern side (**Figure 9**). The concrete block is 0.39 m long by 0.3 m wide and 0.65 m tall. There is a 0.09 m wide by 0.08 m deep groove on the stream side of the block. A stacked and mortared stone wall extends to the west from the concrete block a distance of 8.1 m. This wall is 0.45 m wide and 0.41 m tall. The stone block is located c.1.3 m east of the concrete block on the opposite side of the narrow stream bed. It is 1.5 m long, 1.1 m wide and 0.51 m tall. A groove similar to the one in the concrete block is present on the stream side of the block. This feature appears to have been used to control water

**Figure 8. Site 22353, Feature D water control gate (view to west; from Haun et al. 2004:39).**

**Figure 9. Site 22353, Feature E water control gate (view to northwest; from Haun et al. 2004:40).**

flow into and out of the fishpond. It is likely that a wooden plank or piece of metal was placed in the opposing grooves to control the flow.

**Feature F**

Feature F consists of two concrete walls located on each side of the main entrance to the fishpond (**Figure 10**). The wall on the western side of the entrance is 5.9 m long (east-west) and 0.4 m wide. The western 1.75 m of the wall is located on the shore. This section is 0.67 m in height. The eastern 4.15 m of the wall extends into the fishpond entrance, measuring 0.35 m above the water. The wall on the eastern side of the entrance is 3.5 m long (east-west) and 0.4 m wide and is located entirely on the shoreline. The wall ranges in height from 0.42 m tall at the eastern end and 1.25 m tall at the western end, adjacent to the fishpond entrance. The location of these two walls at the mouth of the fishpond indicates they functioned as a water control gate.

**Feature G**

Feature G is a concrete wall that extends between a low island at the mouth of the fishpond, to the shore. The wall is 22.0 m in length (northeast-southwest), 0.85 m in width, and 0.65 m in height (**Figure 11**). Two sections of 1.0 m diameter concrete pipe are located adjacent to the northeastern end of the wall, resting on the shore. A block comprised of mortared red bricks is situated adjacent to the concrete pipes. This block is 2.0 m long, 0.75m wide, and 1.2 m in height. The location of the concrete wall between the low island and the shore suggest that it may have been used to divert water into the fishpond.

**Feature H**

Feature H is the fishpond around which Features A through G are located. This feature was subjected to an in-depth study by Murabayashi et al. (1990). The fishpond is irregularly shaped, with overall maximum dimensions of c. 306 m long (east-west) by 126 m wide (27,934.24 sq m or 6.89 acres). The remains of stone walls were observed around the southeast and northeast sides of the pond. According to Murabayashi et al., "It is possible that this reinforcing wall once extended around the entire pond basin, as all other edges are covered with grass and/or bulrushes (1990:194).

There is a c. 8.0 m wide entrance into the fishpond at the southern end, bordered by the Feature F concrete walls. There are two lobes that extend off the main pond, one to the east and one to the north. The eastern lobe contained water during the current study and the northern lobe was dry. The northern lobe is separated from the main pond by the Feature D gate indicating the lobe functioned as a separate pond. The eastern lobe lacks a gate and may be the result of fill deposition during historic use of the pond area for recreation. The nature of Feature H indicates it originated as a prehistoric aquaculture feature. The historic modifications noted during the survey (Features D-G) indicate the pond was also used historically. (Haun et al. 2004:36-41)

Site 22353 has elements associated with both the pre-contact and historic use of this area. The Feature H fishpond originated as a pre-contact aquaculture feature. The walls and water control gates located within and adjacent to the fishpond were constructed historically as elements of this aquaculture system. The bridges and the concrete slab are interpreted as recreational facilities constructed and used by Hutchinson Sugar Plantation employees. Site 22353 is unaltered and in fair condition. It was assessed as significant as an excellent example of a site type (Criterion "c") and for its information content (Criterion "d") by Haun et al. (2004:86) and was recommended for preservation.

**Figure 10. Site 22353, Feature F concrete walls in Feature H pond (view to southeast; from Haun et al. 2004:40).**

**Figure 11. Site 22353, Feature G concrete wall in Feature H pond (view to east-northeast; from Haun et al. 2004:42).**

## ARCHAEOLOGICAL SITES LOCATED WITHIN 0.5-MILES OF THE APE

As requested by the SHPD for Section 106 projects, background research was conducted to identify any previously identified historic properties within 0.5 miles of the APE. Excluding the previously discussed Site 22353, the research identified 57 sites with a total of 168 features located within 0.5 miles of the APE (see **Figure 4**). These sites were identified during the previously discussed Haun et al. (2004) AIS, and during work conducted by the Department of Anthropology at the Bernice P. Bishop Museum (BPBM; Ayres 1970), Archaeological Consultants of the Pacific (ACP; Guerriero, Gregg and Kennedy 2006b), Rechtman Consulting, LLC (RC; Clark, Ah Sam, Ketner and Rechtman 2013) and ASM Affiliates (ASM; Clark and Rechtman 2019). The location of the projects is presented in **Figure 12** and are summarized in **Table 1**.

The earliest examination of archaeological sites in the Honu'apo area was conducted by the Reverand William Ellis who visited the region in 1823 (Ellis 2004). During his stay he visited the ruins of the Kamala'i Heiau on the northeastern side of Honu'apo Bay and made the following observations:

> ... some of our number visited the ruins of a heiau, on a point of lava near our lodging. During the evening we made some inquiries respecting it, found it had been dedicated to Tairi, and was thrown down in the general destruction of idols in 1819. (Ellis 2004: 191 192)

John Stokes also examined the remnants of the Kamala'i Heiau in 1906 (cited in Stokes and Dye 1991). According to his account, he was shown the location of the *heiau* ruins by local inhabitants who told him it been destroyed in 1868 by a tidal wave (1991:126). His description of the *heiau* is as follows:

> Heiau of Kamala'i, land of Honu'apo, Ka'u. Now entirely destroyed, the site is on the point northeast of Honu'apo harbor. It was said to have been a sacrificial heiau for human victims and to have been an enclosure. It was thought to have been dedicated to Kane and Lono. (cited in Stokes and Dye *ibid*).

The catastrophic tsunami that destroyed Kamala'i Heiau occurred in early April of 1868. According to Kelly (1980:37-42), a strong earthquake and eruption caused a massive mudflow in Wood Valley and a tidal wave that struck the Ka'ū coast including Honu'apo causing massive destruction. Lava flows and landslides also occurred. The events destroyed churches, dwellings, roads, and fishponds. A coconut grove and settlement at Honu'apo Bay were swept away. Only a small *hale halawai* on the crest of a hill above the settlement was spared. Landslides along the coastal cliffs southeast of the settlement closed the coastal road and residents were forced to use the inland route.

In 1970 William Ayres conducted a reconnaissance survey of all lands owned by C. Brewer land located seaward Highway 11 within Honu'apo, Hi'ona'a, and a portion of Hokukano Ahupua'a in the Ka'u District (see **Figure 12**). The survey identified more than 200 sites in this area, however, little descriptive information regarding these sites is included. The sites consist of habitations (enclosures, platforms, and walled shelters), burials, and *kipuka*, which were interpreted as planting areas. The fishpond at Honu'apo was also identified. The habitation features situated in exposed areas along the coast were interpreted to be temporary shelters associated with fishing. Many of the sites in the northern half of Honu'apo, and the central and northern portion of Hi'ona'a were concentrated in a band between 60 m and 200 m from the shoreline. Two other concentrations were situated further inland on higher ground in both Honu'apo and Hi'ona'a.

The majority of the Ayres (1970) sites within 0.5-miles of the APE have been assigned SIHP site designations during subsequent projects (discussed below; see **Table 1**). There are however eight agricultural planting areas identified by Ayres (1970) that were not. These consist of BPBM Temporary Site numbers B13-18 through B13-23, B13-63 and B13-67 (see **Figure 4**). These areas consist of shallow depressions that could have been used for cultivation; however, they lack any evidence of modification and were subsequently not documented or assigned site numbers during an

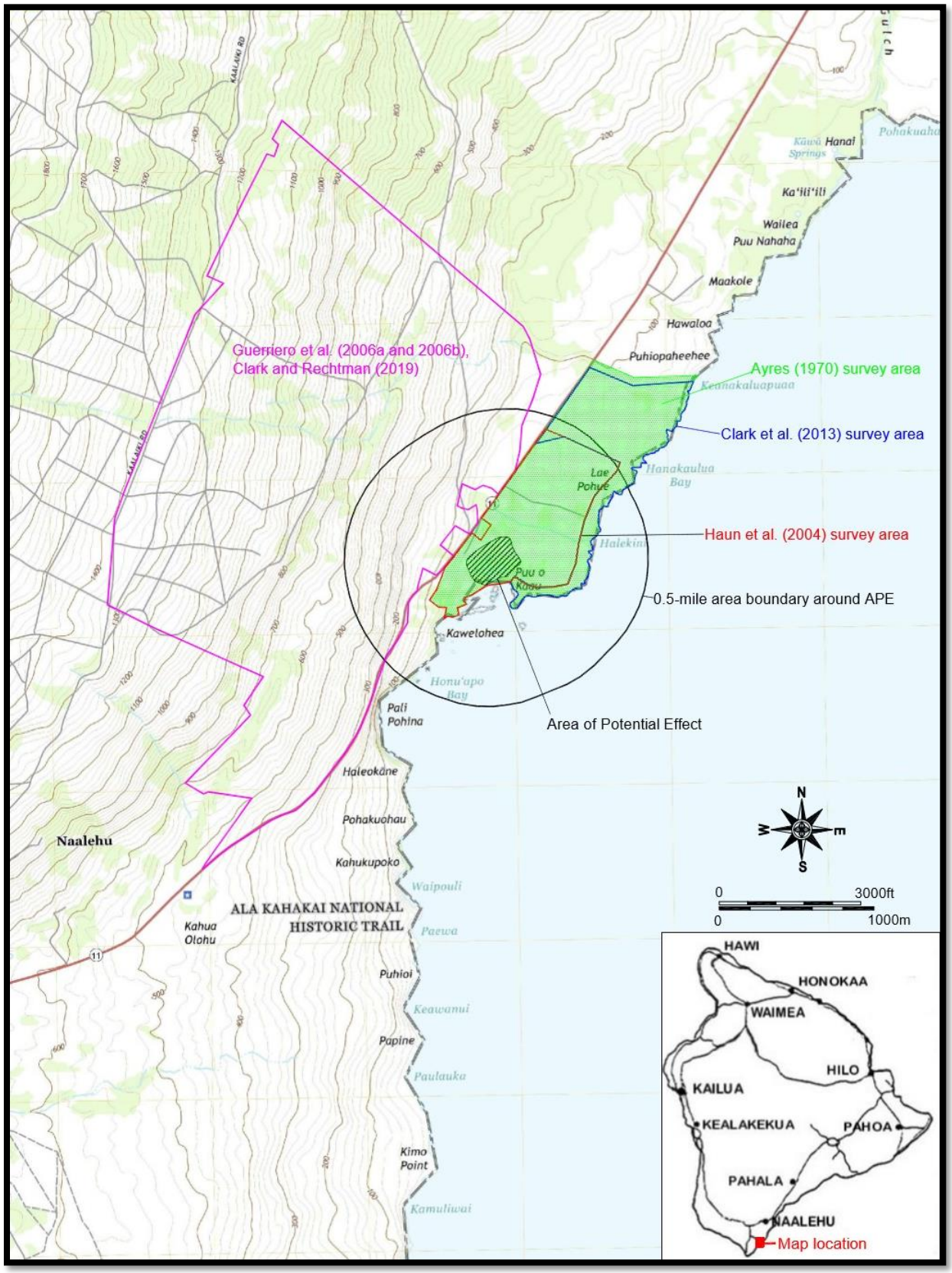


**Figure 12. Location of archaeological studies in vicinity of APE (obtained from usgs.com).**

**Table 1. Summary of sites within APE and within 0.5-miles of APE.**

| Site Number | No. of Feature | Formal type | Function | Researcher | | | | | | Significant assessment* | Recommended treatment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ayres (1970) | Rosendahl (1986) | Haun, Henry and Ayres (2004) | Guerriero et al. (2006) | Clark et al. (2013) | Clark and Rechtman (2019) | | |
| 3853 | 1 | Kamala'i Heiau | Ceremonial | | | | | 1 | | D, E | Preservation |
| 22352 | 11 | Complex | Historic foundation, wharf, transportation and erosion control | | | 1 | | | | D | No further work |
| 22353 - within APE | 8 | Complex | Aquaculture, historic foundation, and transportation | 1 | | 1 | | | | C, D | Preservation |
| 22354 | 1 | Cattle guard | Ranching | | | 1 | | | | D | No further work |
| 22355 | 2 | Complex | Water transportation | | | 1 | | | | Modern | No further work |
| 22356 | 1 | Flume | Water transportation | 1 | | 1 | | 1 | | D | No further work |
| 22357 | 1 | Enclosure | Ranching | | | 1 | | | | D | No further work |
| 22358 | 1 | Overhang | Temporary habitation | | | 1 | | | | D | No further work |
| 22359 | 1 | Wall | Ranching | | | 1 | | | | D | No further work |
| 22360 | 1 | Pipe stanchion | Water transportation | | | 1 | | | | Modern | No further work |
| 22361 | 1 | Artifact scatter | Disposal | | | 1 | | | | Modern | No further work |
| 22362 | 1 | Modified outcrop | Agriculture | | | 1 | | | | D | No further work |
| 22363 | 1 | Enclosure | Temporary habitation | | | 1 | | | | D | No further work |
| 22364 | 1 | Cave | Agriculture | 1 | | 1 | | | | D | No further work |
| 22365 | 2 | Complex | Agriculture | | | 1 | | | | D | No further work |
| 22366 | 1 | Mound | Agriculture | | | 1 | | | | D | No further work |
| 22367 | 1 | Enclosure | Ranching | | | 1 | | | | D | No further work |
| 22368 | 1 | Mound | Agriculture | | | 1 | | | | D | No further work |
| 22369 | 1 | Artifact scatter | Disposal | | | 1 | | | | Modern | No further work |
| 22370 | 1 | Artifact scatter | Disposal | | | 1 | | | | Modern | No further work |
| 22371 | 1 | Overhang | Temporary habitation | | | 1 | | | | D | No further work |
| 22372 | 1 | Artifact scatter | Disposal | | | 1 | | | | Modern | No further work |
| 22373 | 1 | Artifact scatter | Disposal | | | 1 | | | | Modern | No further work |
| 22374 | 1 | Enclosure | Ranching | | | 1 | | | | D | No further work |
| 22375 | 2 | Complex | Agriculture | | | 1 | | | | D | No further work |
| 22376 | 5 | Complex | Permanent habitation | 1 | | 1 | | | | C, D | Preservation |
| 22377 | 2 | Complex | Rock art | | | 1 | | | | C, D | Preservation |
| 22378 | 3 | Complex | Rock art | | 1 | 1 | | | | C, D | Preservation |

**Table 1. Summary of sites within APE or within 0.5-miles of APE (cont.)**

| Site Number | No. of Feature | Formal type | Function | Researcher | | | | | | Significant assessment* | Recommended treatment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ayres (1970) | Rosendahl (1986) | Haun, Henry and Ayres (2004) | Guerriero et al. (2006) | Clark et al. (2013) | Clark and Rechtman (2019) | | |
| 22379 | 1 | Platform | Permanent habitation | 1 | | 1 | | | | C, D | Preservation |
| 22380 | 2 | Complex | Burial/Probable burial | 1 | | 1 | | | | C, D, E | Preservation |
| 22381 | 3 | Complex | Agriculture | | | 1 | | | | D | No further work |
| 22382 | 1 | Enclosure | Temporary habitation | 1 | | 1 | | | | D | No further work |
| 22383 | 16 | Complex | Permanent habitation | 1 | | 1 | | 1 | | C, D | Preservation |
| 24404 | 1 | Monument | Former Historic cemetery | | | | 1 | | 1 | D, E | Preservation |
| 24409 | 4 | Complex | Boundary/Agriculture | | | | 1 | | 1 | D | Preservation |
| 24410 | 1 | Enclosure | Ranching | | | | 1 | | 1 | D | No further work |
| 24412 | 6 | Complex | Boundary | | | | 1 | | 1 | D | No further work |
| 26921 | 65 | Complex | Bait cups/Salt pans | | | | | 1 | | D, E | Preservation |
| 26922 | 1 | Monument | Marker | | | | | 1 | | D | Preservation |
| 26923 | 1 | L-shape | Temporary habitation | 1 | | | | 1 | | D | Preservation |
| 26924 | 2 | Complex | Permanent habitation | 1 | | | | 1 | | D | Preservation |
| 26926 | 1 | Lava blister | Temporary habitation | 1 | | | | 1 | | D | Preservation |
| 29390 | 1 | Railroad grade | Transportation | | | | | | 1 | A, D | Preservation |
| 30738 | 1 | Wall | Ranching | | | | | | 1 | D | No further work |
| 30740 | 1 | Wall | Ranching | | | | | | 1 | D | No further work |
| 30747 | 1 | Wall | Ranching | | | | | | 1 | D | No further work |
| 30751 | 1 | Terrace | Transportation | | | | | | 1 | D | Preservation |
| 30754 | 1 | Wall | Ranching | | | | | | 1 | D | No further work |
| 30756 | 1 | Wall | Ranching | | | | | | 1 | D | No further work |
| 30757 | 1 | Modified drainage | Ranching | | | | | | 1 | D | No further work |
| B13-18 | 1 | Planting area | Agriculture | 1 | | 1 | | | | Not assessed | |
| B13-19 | 1 | Planting area | Agriculture | 1 | | 1 | | | | Not assessed | |
| B13-20 | 1 | Planting area | Agriculture | 1 | | 1 | | | | Not assessed | |
| B13-21 | 1 | Planting area | Agriculture | 1 | | 1 | | | | Not assessed | |
| B13-22 | 1 | Planting area | Agriculture | 1 | | 1 | | | | Not assessed | |
| B13-23 | 1 | Planting area | Agriculture | 1 | | 1 | | | | Not assessed | |
| B13-63 | 1 | Planting area | Agriculture | 1 | | 1 | | | | Not assessed | |
| B13-67 | 1 | Planting area | Agriculture | 1 | | 1 | | | | Not assessed | |
| **Total** | **176** | | | **19** | **1** | **40** | **4** | **8** | **12** | | |

Significance assessments - A = association with important event, C = distinctive site type, D = Information content, E = cultural value

AIS conducted by Haun et al. (2004).

In 2000, Haun & Associates (Haun, Henry and Ayres 2004) conducted an AIS within Honu'apo Ahupua'a (see **Figure 12**). The parcel is bordered on the west by Highway 11 and on the south by Whittington Park and the ocean. The northern project area boundary consists of the division between Hi'ona'a and Honu'apo Ahupua'a in the south, and the eastern boundary is the conservation zone that is approximately 300 feet inland from the shoreline. The survey identified 32 sites with a total of 77 features, all of which are located within the 0.5-mile area surrounding the APE (Sites 50-10-74-22352 through 50-10-74-22838). These sites consist of the previously discussed Site 22353 complex, ten complexes of features that contain from two to 16 features, and 21 single feature sites. The report was apparently reviewed and accepted by SHPD; however, the acceptance letter is not on file within the SHPD library and was not available for inclusion in this report. The sites identified by Haun et al. (2004) are summarized in **Table 1**, with the 77 identified features summarized in **Table 2** and **Table 3**. Detailed descriptions of these sites are presented in **Appendix A**.

In 2006, ACP (Guerriero et al. 2006a and 2006b) conducted an AIS of an approximately 1,752-acre area within Honu'apo, Hi'ona'a, Kī'olokū, and Kaunāmano Ahupua'a (see **Figure 12**). These combined studies identified 14 sites consisting of Sites 50-10-74-24381 through 50-10-74-24384 and Sites 50-10-74-24403 through 50-10-74-24412. These reports were subsequently reviewed and accepted by SHPD in in August 22, 2007 letters (Log Nos: 2006.3820 and 2006.3821, Doc Nos: 0708LM03 and 0708LM02; **Appendix B** and **Appendix C**).

The Guerriero et al. (2006a and 2006b) AIS was subsequently updated by ASM (Clark et al. 2019) due to the presence of previously undocumented features. A total of 48 sites with 179 features were recorded, including the 14 of the sites previously identified by Guerriero et al. (2006a, 2006b), a portion of the Hutchinson Plantation railroad (Site 50-10-74-29390), and 33 newly identified sites (Sites 50-10-74-30731 through 50-10-74-30763). Of these 48 sites, 12 sites with a total of 20 features are located within the 0.5-mile area surrounding the APE (see **Figure 4** and **Table 1, Table 2,** and **Table 3**). These consist of Sites 24404, 24409, 24410,24412, 29390, 30738, 30740, 30747, 30751, 30754, 30756 and 30757 (see **Appendix A** for descriptions). The Clark et al. (2019) AIS report was subsequently reviewed and accepted by SHPD in a December 27, 2019 letter (Log No. 2018.00273; Doc. No 1912SN05; **Appendix D**).

In 2010, RC (Clark and Rechtman 2013) conducted an AIS of a 125-acre parcel Honu'apo and Hi'ona'a Ahupua'a for the proposed park expansion at Honu'apo (see **Figure 12**). This survey included the coastal portions of the Ayres (1970) survey area and abutted the seaward side of the Haun et al. (2004) survey area (see **Figure 4**). This AIS identified 58 sites with a total of 141 features consisting of the ruins of the Site 50-10-74-3853 Kamala'i Heiau, portions of two sites previously documented by Haun et al. (2004 (Sites 22356 and 22383) and 55 newly documented sites (Sites 50-10-74-26921 through 50-10-74-26975). Many of the temporary sites identified by Ayres (1970) were incorporated into these SIHP site designations. Of these 58 sites, eight sites with a total of 15 features are located within the 0.5-mile area surrounding the APE (see **Figure 4** and **Table 1, Table 2** and **Table 3**). These consist of Sites 3853, 22356, 22383-P, 26921 through 26924 and 26926 (see **Appendix A** for descriptions). The Clark and Rechtman (2013) AIS report was subsequently reviewed and accepted by SHPD in a February 4, 2013 letter (Log No. 2013.0086; Doc. No 1301SN14; **Appendix E**).

The 57 total sites within the 0.5-mile area surround the APE consist of 13 complexes of features containing from two to 65 features and 44 single feature sites (see **Figure 4** and **Table 1**). Of the 57 sites, 16 were recommended for preservation, 33 were recommended for no further work, and eight were not assessed. The preservation sites consist of the remnants of the Kamala'i Heiau (Site 50-10-74-3853), four permanent habitation sites (Sites 50-10-74-22376, 50-10-74-22379, 50-10-74-22383 and 50-10-74-26924), two petroglyph sites (Sites 50-10-74-22377 and 50-10-74-22378), a burial site (Site 50-10-74-22380), a former historic cemetery (Site 50-10-74-24404), a complex of boundary

**Table 2. Summary of feature formal type of sites within APE or within 0.5-miles of APE.**

| Site Number | No. of Feature | Formal type | Researcher | Formal type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Basin | Enclosure | Wall | Mound | Planting area | Concrete slab | Artifact scatter | Petroglyph | Platform | Modified outcrop | Terrace | Water ccontrol gate | Alignment | Cave/Lava blister | Concrete, stone and metal structure | Concrete block(s) | Concrete wall | Monument | Overhang | Cattle guard | Concrete box | Concrete footbridge | Concrete steppingstones | Electrical panel | Fishpond | Flume | Heiau | L-shape | Modified drainage | Pipe stanchion | Railroad grade | Railroad rail |
| 3853 | 1 | Kamala'i Heiau | Clark et al. (2013) | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | |
| 22352 | 11 | Complex | Haun et al. (2004) | | | | | | 5 | | | | | | | | | 2 | 2 | 1 | | | | | | | | | | | | | | | 1 |
| 22353 (within APE) | 8 | Complex | Ayres (1970), Haun et al. (2004) | | | | | | 1 | | | | | | 3 | | | | | 1 | | | | | 1 | 1 | | 1 | | | | | | | |
| 22354 | 1 | Cattle guard | Haun et al. (2004) | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | |
| 22355 | 2 | Complex | Haun et al. (2004) | | | | | | | | | | | | | | | | | | | | | 1 | | | 1 | | | | | | | | |
| 22356 | 1 | Flume | Ayres (1970), Haun et al. (2004), Clark et al. (2013) | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | |
| 22357 | 1 | Enclosure | Haun et al. (2004) | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22358 | 1 | Overhang | Haun et al. (2004) | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | |
| 22359 | 1 | Wall | Haun et al. (2004) | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22360 | 1 | Pipe stanchion | Haun et al. (2004) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | |
| 22361 | 1 | Artifact scatter | Haun et al. (2004) | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22362 | 1 | Modified outcrop | Haun et al. (2004) | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 22363 | 1 | Enclosure | Haun et al. (2004) | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22364 | 1 | Cave | Ayres (1970), Haun et al. (2004) | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | |
| 22365 | 2 | Complex | Haun et al. (2004) | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 22366 | 1 | Mound | Haun et al. (2004) | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22367 | 1 | Enclosure | Haun et al. (2004) | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22368 | 1 | Mound | Haun et al. (2004) | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22369 | 1 | Artifact scatter | Haun et al. (2004) | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22370 | 1 | Artifact scatter | Haun et al. (2004) | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22371 | 1 | Overhang | Haun et al. (2004) | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | |
| 22372 | 1 | Artifact scatter | Haun et al. (2004) | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22373 | 1 | Artifact scatter | Haun et al. (2004) | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22374 | 1 | Enclosure | Haun et al. (2004) | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22375 | 2 | Complex | Haun et al. (2004) | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**Table 2. Summary of feature formal type of sites within APE or within 0.5-miles of APE (cont.).**

| Site Number | No. of Feature | Formal type | Researcher | Formal type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Basin | Enclosure | Wall | Mound | Planting area | Concrete slab | Artifact scatter | Petroglyph | Platform | Modified outcrop | Terrace | Water ccontrol gate | Alignment | Cave/Lava blister | Concrete, stone and metal structure | Concrete block(s) | Concrete wall | Monument | Overhang | Cattle guard | Concrete box | Concrete footbridge | Concrete steppingstones | Electrical panel | Fishpond | Flume | Heiau | L-shape | Modified drainage | Pipe stanchion | Railroad grade | Railroad rail |
| 22376 | 5 | Complex | Ayres (1970), Haun et al. (2004) | | 1 | 1 | 1 | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22377 | 2 | Complex | Haun et al. (2004) | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22378 | 3 | Complex | Rosendahl (1986), Haun et al. (2004) | | | | | | | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22379 | 1 | Platform | Ayres (1970), Haun et al. (2004) | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22380 | 2 | Complex | Ayres (1970), Haun et al. (2004) | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22381 | 3 | Complex | Haun et al. (2004) | | | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22382 | 1 | Enclosure | Haun et al. (2004) | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22383 | 16 | Complex | Ayres (1970), Haun et al. (2004), Clark et al. (2013) | | 10 | 2 | 2 | | | | | | | 1 | | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 24404 | 1 | Monument | Guerriero et al. (2006b), Clark and Rechtman (2019) | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | |
| 24409 | 4 | Complex | Guerriero et al. (2006b), Clark and Rechtman (2019) | | | 3 | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| 24410 | 1 | Enclosure | Guerriero et al. (2006b), Clark and Rechtman (2019) | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24412 | 6 | Complex | Guerriero et al. (2006b), Clark and Rechtman (2019) | | | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26921 | 65 | Complex | Clark et al. (2013) | 65 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26922 | 1 | Monument | Clark et al. (2013) | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | |
| 26923 | 1 | L-shape | Ayres (1970), Clark et al. (2013) | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | |
| 26924 | 2 | Complex | Ayres (1970), Clark et al. (2013) | | 1 | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 26926 | 1 | Lava blister | Ayres (1970), Clark et al. (2013) | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | |
| 29390 | 1 | Railroad grade | Clark and Rechtman (2019) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | |
| 30738 | 1 | Wall | Clark and Rechtman (2019) | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30740 | 1 | Wall | Clark and Rechtman (2019) | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30747 | 1 | Wall | Clark and Rechtman (2019) | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30751 | 1 | Terrace | Clark and Rechtman (2019) | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| 30754 | 1 | Wall | Clark and Rechtman (2019) | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**Table 2. Summary of feature formal type of sites within APE or within 0.5-miles of APE (cont.).**

| Site Number | No. of Feature | Formal type | Researcher | Formal type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Basin | Enclosure | Wall | Mound | Planting area | Concrete slab | Artifact scatter | Petroglyph | Platform | Modified outcrop | Terrace | Water ccontrol gate | Alignment | Cave/Lava blister | Concrete, stone and metal structure | Concrete block(s) | Concrete wall | Monument | Overhang | Cattle guard | Concrete box | Concrete footbridge | Concrete steppingstones | Electrical panel | Fishpond | Flume | Heiau | L-shape | Modified drainage | Pipe stanchion | Railroad grade | Railroad rail |
| 30756 | 1 | Wall | Clark and Rechtman (2019) | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30757 | 1 | Modified drainage | Clark and Rechtman (2019) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | |
| B13-18 | 1 | Planting area | Ayres (1970), Haun et al. (2004) | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B13-19 | 1 | Planting area | Ayres (1970), Haun et al. (2004) | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B13-20 | 1 | Planting area | Ayres (1970), Haun et al. (2004) | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B13-21 | 1 | Planting area | Ayres (1970), Haun et al. (2004) | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B13-22 | 1 | Planting area | Ayres (1970), Haun et al. (2004) | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B13-23 | 1 | Planting area | Ayres (1970), Haun et al. (2004) | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B13-63 | 1 | Planting area | Ayres (1970), Haun et al. (2004) | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B13-67 | 1 | Planting area | Ayres (1970), Haun et al. (2004) | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Total** | **168** | | | **65** | **18** | **18** | **10** | **8** | **6** | **5** | **5** | **5** | **3** | **3** | **3** | **2** | **2** | **2** | **2** | **2** | **2** | **2** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** |

**Table 3. Summary of feature function at sites within APE and within 0.5-miles of APE.**

| Site Number | No. of Feature | Function | Researcher | Function | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Bait cups/Salt pans | Permanent habitation | Agriculture | Ranching | Boundary | Historic foundation | Temporary habitation | Aquaculture | Disposal | Rock art | Transportation | Water transportation | Burial/Probable burial | Historic wharf | Ceremonial | Erosion control | Former Historic cemetery | Marker |
| 3853 | 1 | Ceremonial | Clark et al. (2013) | | | | | | | | | | | | | | | 1 | | | |
| 22352 | 11 | Historic foundation, wharf, transportation and erosion control | Haun et al. (2004) | | | | | | 7 | | | | | 1 | | | 2 | | 1 | | |
| 22353 (within APE) | 8 | Aquaculture, historic foundation, and transportation | Ayres (1970), Haun et al. (2004) | | | | | | 1 | | 5 | | | 2 | | | | | | | |
| 22354 | 1 | Ranching | Haun et al. (2004) | | | | 1 | | | | | | | | | | | | | | |
| 22355 | 2 | Water transportation | Haun et al. (2004) | | | | | | | | | | | | 2 | | | | | | |
| 22356 | 1 | Water transportation | Ayres (1970), Haun et al. (2004), Clark et al. (2013) | | | | | | | | | | | | 1 | | | | | | |
| 22357 | 1 | Ranching | Haun et al. (2004) | | | | 1 | | | | | | | | | | | | | | |
| 22358 | 1 | Temporary habitation | Haun et al. (2004) | | | | | | | 1 | | | | | | | | | | | |
| 22359 | 1 | Ranching | Haun et al. (2004) | | | | 1 | | | | | | | | | | | | | | |
| 22360 | 1 | Water transportation | Haun et al. (2004) | | | | | | | | | | | | 1 | | | | | | |
| 22361 | 1 | Disposal | Haun et al. (2004) | | | | | | | | | 1 | | | | | | | | | |
| 22362 | 1 | Agriculture | Haun et al. (2004) | | | 1 | | | | | | | | | | | | | | | |
| 22363 | 1 | Temporary habitation | Haun et al. (2004) | | | | | | | 1 | | | | | | | | | | | |
| 22364 | 1 | Agriculture | Ayres (1970), Haun et al. (2004) | | | 1 | | | | | | | | | | | | | | | |
| 22365 | 2 | Agriculture | Haun et al. (2004) | | | 2 | | | | | | | | | | | | | | | |
| 22366 | 1 | Agriculture | Haun et al. (2004) | | | 1 | | | | | | | | | | | | | | | |
| 22367 | 1 | Ranching | Haun et al. (2004) | | | | 1 | | | | | | | | | | | | | | |
| 22368 | 1 | Agriculture | Haun et al. (2004) | | | 1 | | | | | | | | | | | | | | | |
| 22369 | 1 | Disposal | Haun et al. (2004) | | | | | | | | | 1 | | | | | | | | | |
| 22370 | 1 | Disposal | Haun et al. (2004) | | | | | | | | | 1 | | | | | | | | | |
| 22371 | 1 | Temporary habitation | Haun et al. (2004) | | | | | | | 1 | | | | | | | | | | | |
| 22372 | 1 | Disposal | Haun et al. (2004) | | | | | | | | | 1 | | | | | | | | | |
| 22373 | 1 | Disposal | Haun et al. (2004) | | | | | | | | | 1 | | | | | | | | | |
| 22374 | 1 | Ranching | Haun et al. (2004) | | | | 1 | | | | | | | | | | | | | | |
| 22375 | 2 | Agriculture | Haun et al. (2004) | | | 2 | | | | | | | | | | | | | | | |
| 22376 | 5 | Permanent habitation | Ayres (1970), Haun et al. (2004) | | 5 | | | | | | | | | | | | | | | | |
| 22377 | 2 | Rock art | Haun et al. (2004) | | | | | | | | | | 2 | | | | | | | | |
| 22378 | 3 | Rock art | Rosendahl (1986), Haun et al. (2004) | | | | | | | | | | 3 | | | | | | | | |
| 22379 | 1 | Permanent habitation | Ayres (1970), Haun et al. (2004) | | 1 | | | | | | | | | | | | | | | | |
| 22380 | 2 | Burial/Probable burial | Ayres (1970), Haun et al. (2004) | | | | | | | | | | | | | 2 | | | | | |
| 22381 | 3 | Agriculture | Haun et al. (2004) | | | 3 | | | | | | | | | | | | | | | |
| 22382 | 1 | Temporary habitation | Haun et al. (2004) | | | | | | | 1 | | | | | | | | | | | |
| 22383 | 16 | Permanent habitation | Ayres (1970), Haun et al. (2004), Clark et al. (2013) | | 16 | | | | | | | | | | | | | | | | |
| 24404 | 1 | Former Historic cemetery | Guerriero et al. (2006b), Clark and Rechtman (2019) | | | | | | | | | | | | | | | | | 1 | |

**Table 3. Summary of feature function at sites within APE and within 0.5 miles of APE (cont.).**

| Site Number | No. of Feature | Function | Researcher | Function | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Bait cups/Salt pans | Permanent habitation | Agriculture | Ranching | Boundary | Historic foundation | Temporary habitation | Aquaculture | Disposal | Rock art | Transportation | Water transportation | Burial/Probable burial | Historic wharf | Ceremonial | Erosion control | Former Historic cemetery | Marker |
| 24409 | 4 | Boundary/Agriculture | Guerriero et al. (2006b), Clark and Rechtman (2019) | | | 1 | | 3 | | | | | | | | | | | | | |
| 24410 | 1 | Ranching | Guerriero et al. (2006b), Clark and Rechtman (2019) | | | | 1 | | | | | | | | | | | | | | |
| 24412 | 6 | Boundary | Guerriero et al. (2006b), Clark and Rechtman (2019) | | | | | 6 | | | | | | | | | | | | | |
| 26921 | 65 | Bait cups/Salt pans | Clark et al. (2013) | 65 | | | | | | | | | | | | | | | | | |
| 26922 | 1 | Marker | Clark et al. (2013) | | | | | | | | | | | | | | | | | | 1 |
| 26923 | 1 | Temporary habitation | Ayres (1970), Clark et al. (2013) | | | | | | | 1 | | | | | | | | | | | |
| 26924 | 2 | Permanent habitation | Ayres (1970), Clark et al. (2013) | | 2 | | | | | | | | | | | | | | | | |
| 26926 | 1 | Temporary habitation | Ayres (1970), Clark et al. (2013) | | | | | | | 1 | | | | | | | | | | | |
| 29390 | 1 | Transportation | Clark and Rechtman (2019) | | | | | | | | | | | 1 | | | | | | | |
| 30738 | 1 | Ranching | Clark and Rechtman (2019) | | | | 1 | | | | | | | | | | | | | | |
| 30740 | 1 | Ranching | Clark and Rechtman (2019) | | | | 1 | | | | | | | | | | | | | | |
| 30747 | 1 | Ranching | Clark and Rechtman (2019) | | | | 1 | | | | | | | | | | | | | | |
| 30751 | 1 | Transportation | Clark and Rechtman (2019) | | | | | | | | | | | 1 | | | | | | | |
| 30754 | 1 | Ranching | Clark and Rechtman (2019) | | | | 1 | | | | | | | | | | | | | | |
| 30756 | 1 | Ranching | Clark and Rechtman (2019) | | | | 1 | | | | | | | | | | | | | | |
| 30757 | 1 | Ranching | Clark and Rechtman (2019) | | | | 1 | | | | | | | | | | | | | | |
| B13-18 | 1 | Agriculture | Ayres (1970), Haun et al. (2004) | | | 1 | | | | | | | | | | | | | | | |
| B13-19 | 1 | Agriculture | Ayres (1970), Haun et al. (2004) | | | 1 | | | | | | | | | | | | | | | |
| B13-20 | 1 | Agriculture | Ayres (1970), Haun et al. (2004) | | | 1 | | | | | | | | | | | | | | | |
| B13-21 | 1 | Agriculture | Ayres (1970), Haun et al. (2004) | | | 1 | | | | | | | | | | | | | | | |
| B13-22 | 1 | Agriculture | Ayres (1970), Haun et al. (2004) | | | 1 | | | | | | | | | | | | | | | |
| B13-23 | 1 | Agriculture | Ayres (1970), Haun et al. (2004) | | | 1 | | | | | | | | | | | | | | | |
| B13-63 | 1 | Agriculture | Ayres (1970), Haun et al. (2004) | | | 1 | | | | | | | | | | | | | | | |
| B13-67 | 1 | Agriculture | Ayres (1970), Haun et al. (2004) | | | 1 | | | | | | | | | | | | | | | |
| **Total** | **176** | ` | | **65** | **24** | **20** | **12** | **9** | **8** | **6** | **5** | **5** | **5** | **5** | **4** | **2** | **2** | **1** | **1** | **1** | **1** |

and agricultural features (Site 50-10-74-24409), a complex of bait cups and salt pans (Site 50-10-74-26921), a monument marker (Site 50-10-74-26922), two temporary habitation sites (Sites 50-10-74-26923 and 50-10-74-26926), and two transportation features (Sites 50-10-74-26330 and 50-10-74-30751). These sites are highlighted in red in **Figure 13**.

The 33 sites recommended for no further work consist of a complex of historic foundation wharf, transportation and erosion control features (Site 50-10-74-22352), 12 sites associated with historic ranching (Sites 50-10-74-22354, 50-10-74-22357, 50-10-74-22359, 50-10-74-22367, 50-10-74-22374, 50-10-74-24410, 50-10-74-30738, 50-10-74-30740, 50-10-74-30747, 50-10-74-30754, 50-10-74-30756 and 50-10-74-30757), four temporary habitation sites (Sites 50-10-74-22358, 50-10-74-22363, 50-10-74-22371 and 50-10-74-22382), three water transportation sites (Sites 50-10-74-22355, 50-10-74-22356, and 50-10-74-22360), seven agricultural features (Sites 50-10-74-22362, 50-

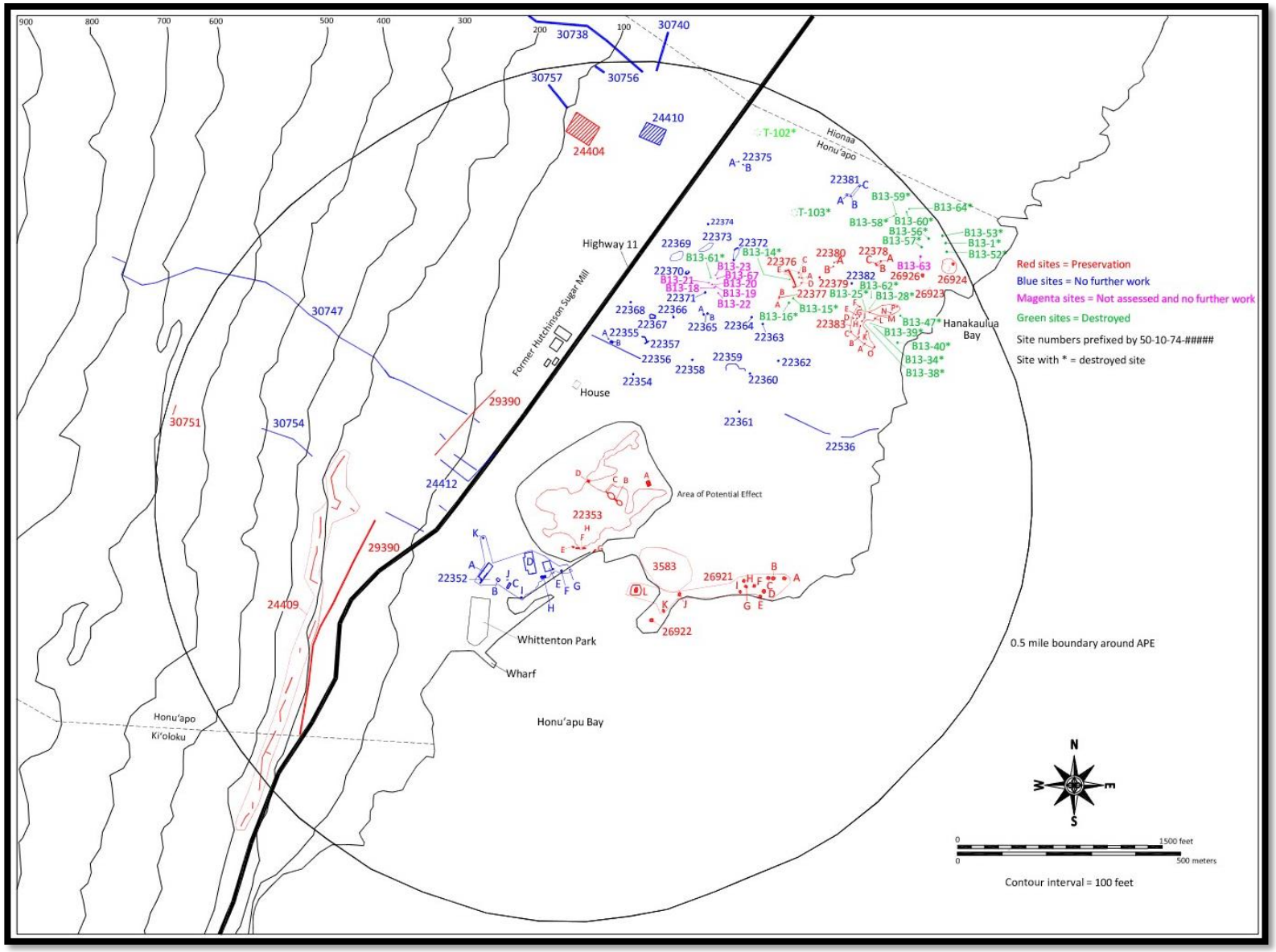


**Figure 13. Treatment of sites within APE and within 0.5-miles of APE.**

10-74-22364, 50-10-74-22365, 50-10-74-22366, 50-10-74-22368, 50-10-74-22375 and 50-10-74-22381), five disposal sites (Sites 50-10-74-22361, 50-10-74-22369, 50-10-74-22370, 50-10-74-22372, and 50-10-74-22373), and one boundary site (Site 50-10-74-24412). These sites are highlighted in blue in **Figure 13**.

The eight remaining sites consist of agricultural planting areas that were initially identified by Ayres (1970) and subsequently relocated by Haun et al. (2004). These consist of Temporary Sites B13-18, B13-19, B13-20, B13-21, B13-22, B13-23, B13-63 and B13-67. The latter study identified no evidence of modification and were therefore not recorded, assigned SIHP site numbers or assessed for significance. These sites require also require no further work and are highlighted in magenta in **Figure 13**.

An additional 23 sites were previously identified within the Haun et al. (2004) AIS survey area by Ayres (1970) and Paul H. Rosendahl, Inc. Ph.D. (PHRI, Rosendahl 1986). However, these features were destroyed prior to 2004 by either a 1975 tsunami that inundated Honu‘apo, or by modern agriculture and/or ranching activities. These consist of 21 sites identified by Ayres (1970; Temporary Sites B13-1, B13-14, B13-15, B13-16, B13-25, B13-28, B13-34, B13-38, B13-39, B13-40, B13-47, B13-52, B13-53, B13-56, B13-57, B13-58, B13-59, B13-60, B13-61, B13-62, and B13-64), and two sites identified by Rosendahl (1986; T-102 and T-103). These sites are summarized in **Table 4** and their locations are highlighted in light green in **Figure 13**. According to Clark et al. (2013), the destruction of these sites may be attributed to the discharging of cane waste and cattle grazing:

> In 1970 the Honu'apo Sugar Mill began discharging cane waste into ponding basins they created within the current project area. The ponding basins occupy all of the low lying areas between Highway 11 and the aforementioned pressure ridges, and they stretch from the pond at Honu'apo Bay to the 'a 'a ridge along the northern boundary of Hi'ona'a Ahupua'a. For several years during the early 1970s cane waste was pumped from Honu'apo Sugar Mill into these ponding basins where it was allowed to settle. The water would filter into the ground and the sediment would slowly fill the basins. Bulldozers would then push the sediment to the makai edges of the basins to create a large soil berm between and against the raised bedrock pressure ridges near the coast. The use of these basins drastically altered the physical environment of the project area and destroyed or buried a number of archaeological features previously recorded by Ayres (1970). It is estimated that the basins covered roughly seventy percent of the inland area of the current project area. After the Honu'apo Sugar Mill closed its doors in the early 1970s, the inland portions of the project area were used, until relatively recently, for grazing cattle. (Clark et al. 2013:4)

The 168 features at the 57 sites within the 0.5-mile surrounding the APE are comprised of 65 basins, 18 enclosures, 18 walls, 10 modified outcrops, eight platforms, five concrete slabs, five artifacts scatters, five petroglyphs, five platforms, three modified outcrops, three terraces, two alignments, two caves/lava blisters, two concrete stone and metal structures, two concrete blocks, two monuments, two overhangs, and one each of the following: cattle guard, concrete box, concrete wall, electrical panel, flume, *heiau*, L-shape, modified depression, pipe stanchion, railroad grade, and railroad rail (see **Table 2**). Functionally, the 168 features consist of bait cups/salt pans (n=65), permanent habitation (24), agriculture (20), ranching (12), boundary (9), historic foundation (7), temporary habitation (6), disposal (5), rock art (5), water transportation (4), transportation (3), burial/probable burial (2), wharf (2), ceremonial (1), erosion control (1), former historic cemetery (1) and marker (1; see **Table 3**).

**Table 4. Summary of destroyed sites.**

| Site Number | No. of Feature | Formal type | Function | Researcher |
|---|---|---|---|---|
| B13-1* | 1 | Enclosure | Habitation | Ayres (1970) |
| B13-14* | 1 | Platform | Habitation | Ayres (1970) |
| B13-15* | 1 | Wall | Ranching | Ayres (1970) |
| B13-16* | 1 | Wall | Ranching | Ayres (1970) |
| B13-25* | 1 | Platform | Habitation | Ayres (1970) |
| B13-28* | 1 | Wall | Boundary | Ayres (1970) |
| B13-34* | 1 | Platform | Habitation | Ayres (1970) |
| B13-38* | 1 | Platform | Habitation | Ayres (1970) |
| B13-39* | 1 | Platform | Habitation | Ayres (1970) |
| B13-40* | 1 | Enclosure | Habitation | Ayres (1970) |
| B13-47* | 1 | Wall | Ranching | Ayres (1970) |
| B13-52* | 1 | Cairn | Marker | Ayres (1970) |
| B13-53* | 1 | Platform | Habitation | Ayres (1970) |
| B13-56* | 1 | Platform | Habitation | Ayres (1970) |
| B13-57* | 1 | Cave | Habitation | Ayres (1970) |
| B13-58* | 1 | Cairn | Marker | Ayres (1970) |
| B13-59* | 1 | Wall | Agriculture | Ayres (1970) |
| B13-60* | 1 | Planting area | Agriculture | Ayres (1970), Rosendahl (1986) |
| B13-61* | 1 | Wall | Ranching | Ayres (1970) |
| B13-62* | 1 | Cave | Habitation | Ayres (1970) |
| B13-64* | 1 | Cairn | Marker | Ayres (1970), Rosendahl (1986) |
| T-102* | 1 | Wall | Ranching | Rosendahl (1986) |
| T-103* | 1 | Wall | Ranching | Rosendahl (1986) |
| **Total** | **23** | | | |

## TREATMENT RECOMMENDATIONS

Based on the results of the literature review, of the 58 sites located within or within 0.5-miles of the APE, 17 sites have been recommended for preservation. These consist of the Site 22353 located within the current APE, and 16 additional sites located outside the APE. The additional preservation sites consist of the remnants of the Kamala'i Heiau (Site 3853), four permanent habitation sites (Sites 22376, 22379, 22383 and 26924), two petroglyph sites (Sites 22377 and 22378), a burial site (Site 22380), a former historic cemetery (Site 24404), a complex of boundary and agricultural features (Site 24409), a complex of bait cups and salt pans (Site 26921), a monument marker (Site 26922), two temporary habitation sites (Sites 26923 and 26926), and two transportation features (Sites 26330 and 30751).

Protective measures to ensure the preservation of the Site 22353 complex will be detailed in an Archaeological Site Preservation Plan (ASPP) currently in preparation by Kulaiwi Archaeology. The remaining 16 preservation sites within 0.5-miles of the APE will not be impacted by the proposed Honu'apo Estuary Wetland Restoration Project and will be avoided by all construction activity. To ensure no impacts to these sites occur, especially those immediately adjacent to the APE (Sites 3853, 26921 and 26922; see **Figure 13**) provisions outlining their protection will be presented in an Archaeological Monitoring Plan, also in preparation by Kulaiwi Archaeology.

## TRANSLATION OF HAWAIIAN WORDS[1]

*ahupua'a* - traditional Hawaiian land unit usually extending from the uplands to the sea

*heiau* - Pre-Christian place of worship, shrine

*hauna* - unpleasant odor, as of spoiling fish or meat

*'ili 'ili* – smooth waterworn pebble

*kipuka* – clear place or oasis within a lava bed where there may be vegetation

*makai* - inland

*mauka* - seaward

[1] - from wehewehe.org

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# APPENDIX A – DESCRIPTIONS OF SITES LOCATED WITHIN 0.5-MILES OF APE

## Site 50-10-74-3583

Site 3583 consists of a rubble pile noted by Clark et al. (2013) that is interpreted as representing the remnants of the Kamalaʻi Heiau. The location of the site is presented in **Figure 4**. site was assessed as significant for its information content (Criterion "d") and for its cultural value by Clark et al. (2013:284) and was recommended for preservation. It is described as follows:

> Site 3583 is the State Inventory of Historic Places designation for Kamalaʻi Heiau. This heiau was said to have been enclosure located on the point at the northeastern end of Honu' apo Bay. Information pertaining to Kamalaʻi Heiau comes from William Ellis, who visited Honuʻapo in 1823 (Ellis 2004), and from John Stokes, who conducted a survey of heiau on the Island of Hawaiʻi in 1906 (Stokes and Dye 1991).
>
> Ellis, during his one night visit to Honuʻapo, stayed at the head man's house on the northeastern point of the bay, and wrote the following description of the heiau:
>
> > ... some of our number visited the ruins of a heiau, on a point of lava near our lodging. During the evening we made some inquiries respecting it, found it had been dedicated to Tairi, and was thrown down in the general destruction of idols in 1819. [Ellis 2004: 191 192]
>
> Stokes, who knew of the heiau from Ellis' journal, was shown its location of by local residents who informed him that it had been destroyed by tidal waves (likely during the eruption of 1868). He recorded the following information regarding this site:
>
> > Heiau of Kamalaʻi, land of Honuʻapo, Kaʻu. Now entirely destroyed, the site is on the point northeast of Honuʻapo harbor. It was said to have been a sacrificial heiau for human victims and to have been an enclosure. It was thought to have been dedicated to Kane and Lono. [Stokes and Dye 1991: 126]
>
> During the current fieldwork the northeastern point of Honuʻapo Bay was thoroughly inspected for any architectural remains of Kamalaʻi Heiau, but none were found. A large area of scattered cobble and boulder rubble that contained numerous *ʻiii ʻiii* and marine shell fragments was noted, however, within a small inlet along the edge of the bay. The rubble is scattered over a roughly 100 meter by 100 meter area along the ocean (**Figure 14**). The rubble may mark the former location of Kamalaʻi Heiau. Clark et al. (2013:44)

## Site 50-10-74-22352

Site 22352 is a complex of historic foundation, wharf, transportation, and erosion control features previously identified by Haun et al. (2004). The extent of the is presented in **Figure 4**. The site was assessed as significant for its information content (Criterion "d") by Haun et al. (2004:86) and recommended for no further work. It is described by Haun et al. (2004) below:

> Site 22352 is a complex of 11 features located in the southwestern corner of the project area, north of Whittington Park and southeast of the fishpond. The identified features include five concrete slabs (Features A-E), two pier foundations (Features F and G), a concrete wall (Feature H), a concrete block (Feature I), a railroad rail (Feature J), and a series of concrete pier blocks (Feature K). The identified features are described below. Site 22352 is in fair condition and is partially altered.

**Figure 14. Cobble rubble at possible former location of Kamala'i Heiau (view to south; from Clark et al. 2013:44)**

**Feature A**

Feature A is a large concrete slab located on the *makai* side of the paved road that leads to Whittington Park. The main portion of the slab is 40.1 m long (northeast-southwest) by 13.0 m wide (**Figure 15**). The slab is 0.9 m tall along the southeastern side and 0.1 m tall along the northwestern side. A raised concrete curb is present along the northeast, northwest, and southwest sides of the slab. It is 0.16 m wide and 0.14 m in height. A set of steps is located in the center of the southeastern wall with a raised concrete curb where the steps meet the slab.

There is an extension to the main slab at the southeastern corner that is 9.2 m long (northeast-southwest) by 1.85 m wide. A set of two concrete steps is located at the southwestern end of this extension. A second set of four steps is present where the extension meets the main slab. The 1944-era historic map of the area illustrates this slab and indicates it functioned as a plantation warehouse. According to this map, a set of railroad tracks, no longer present, once extended along the southeastern side of the slab.

**Feature B**

Feature B is a concrete slab located c. 24.0 m southeast of Feature A on the *makai* side of the paved road leading to Whittington Park. The slab is rectangular-shaped. It is 8.0 m long (west northwest-east southeast) and 6.3 m wide (**Figure 16**). There is a 1.2 m wide raised section at the east-southern end that is 0.2 m higher than the main surface of the slab. Raised concrete curbs are present along the northeast and southwest sides of the slab. These curbs are 0.15 m wide and 0.08 m tall. The northwestern end of the slab is open. Feature B is not illustrated on the historic map of the wharf area, suggesting it was constructed after 1944. The configuration of this slab suggests it may have functioned as a garage or storage shed.

**Figure 15. Site 22352, Feature A concrete slab (view to north; from Haun et al. 2004:31).**

**Figure 16. Site 22352, Feature B concrete slab (view to east-southeast; from Haun et al. 2004:31).**

**Feature C**

Feature C is a concrete slab situated c. 22.0 m southeast of Feature B. The slab is rectangular in shape and is 12.4 m long (north-northeast to south-southwest) by 4.9 m in width. There is a raised concrete curb extending around the perimeter of the slab measuring 0.13 m wide and 0.1 m tall. A 1.2 m wide break in the curb, representing an entrance, is present along the eastern side of the slab at the southern end. A recently constructed stone enclosure has been constructed on top of the slab and large amounts of modern debris are present (**Figure 17**). Feature C corresponds to the location of a Standard Oil warehouse illustrated on the 1944 map.

**Feature D**

Feature D is a large concrete slab located c. 47.0 m northeast of Feature C. This slab is rectangular in shape and is notched at the northwest and southwest corners. The slab is 49.8 m in length (north-northwest to south-southeast), 21.8 m wide, and from 0.02 to 0.1 m in height above the surrounding ground surface (**Figure 18**). The notched areas at the corners of the slab measure 9.5 m long (north-northwest to south-southeast) by 3.5 m wide. The 1944 map indicates the feature functioned as a warehouse associated with the sugar cane plantation.

**Feature E**

Feature E is a concrete slab located to the southwest of the fishpond c. 8.0 m inland from the coastline and c. 19.0 m east of Feature D. The slab is rectangular in shape and is 22.3 m long (north-northwest to south-southeast) by 16.5 m wide. The north, east, and western sides of the slab are from 0.05 to 0.13 m in height above the surrounding ground surface. The southern side, which faces the coastline, is 0.74 m in height. There is a set of three concrete steps at the southeastern corner of the slab that led down to the shoreline. These steps are 0.9 m long and 0.35 m wide with a 0.20 m tall riser. No cultural remains were observed. The 1944 map does not show the Feature E slab, indicting it was constructed after 1944.

**Feature F**

Feature F is a concrete, stone and metal structure located on the coastal escarpment c. 20.0 m east of Feature E. It consists of a large, domed shaped metal object that is 2.3 m in diameter by 1.15 m in height. There is a 0.35 m diameter metal extension on top of the dome. A mortared stone wall extends around the southern and southeastern side of the metal dome. The southern portion of wall is 2.6 m long (east-west) and the southeastern portion is 3.2 m long (northeast-southwest). This wall is 0.4 m wide and ranges in height from 0.5 to 1.36 m. It is apparent that the entire structure was once capped with a concrete slab because an intact section of this slab is present on top of the metal dome at its northeast corner. This structure is not depicted in the 1944 map of the area indicating it was constructed at a later date. The nature of this feature suggests that, along with Feature G described below, it may have functioned as the foundation for a pier or wharf that once extended into the water.

**Feature G**

Feature G is similar to Feature F and is more intact. This feature consists of a concrete slab that is 3.5 m in diameter by 1.3 m tall. The 0.35 m diameter metal extension noted on the top of the Feature F dome is present in the center of the Feature G slab indicating that the features were constructed in the same manner.

**Figure 17. Site 22352, Feature C concrete slab (view to northwest; from Haun et al. 2004:32).**

**Figure 18. Site 22352, Feature D concrete slab (view to north; from Haun et al. 2004:32).**

**Feature H**

Feature H is a concrete wall located on bare pahoehoe lava on the shoreline 9.2 m south-south west of the Feature E concrete slab. The wall measures 10.5 m long (east-west) roughly parallel to the shoreline in this area. It is 0.31 m wide and ranges in height from 0.4 to 0.67 m. A second, displaced section of wall is situated adjacent to the intact wall 1.0 m to the south. The location of this wall on the shoreline, and *makai* of the concrete warehouses in this area, suggests it functioned as a breakwater to prevent the erosion of soil. This wall is not illustrated on the historic wharf-area map indicating that it was likely constructed after 1944.

**Feature I**

Feature I consists of two parallel concrete blocks located at the water's edge at the southern end of the project area. The blocks have fallen to the north but appear to have originally been concreted to the bare lava. Each block is 0.5 m square by 1.97 m long (**Figure 19**). The remains of a metal bracket are present on the top of each pier and each has a vertical groove extending along its inside edge. These grooves are 0.12 m wide and 0.07 m deep. These blocks likely functioned as a support foundation, but it is unclear what they would have supported.

**Feature J**

Feature J consists of a single, small gauge railroad rail that is imbedded in a dirt road, c. 7.0 m northwest of Feature C. The exposed rail is 2.9 m in length (east-west), and is 0.08 m wide (**Figure 20**). No evidence of a railroad bed or wooden ties was noted. A review of the 1944 era historic map of this area depicts a set of railroad tracks in this area, oriented in the same direction as Feature J, indicating that this rail is probably a partially intact remnant of this rail system. The tracks depicted in the map extend along the southern edge of the Feature D plantation warehouse.

**Feature K**

Feature K is a series of four concrete pier blocks and a large stone retaining wall located in the southwestern portion of the project area, c. 57.0 m north of the Feature A concrete slab and c. 12.0 m upslope of the paved road leading to Whittington Park. The feature is situated on a terrace on the side of the slope that appears to have been mechanically leveled. Three of the four pier blocks are situated in an alignment oriented north-south. These blocks measure 0.61 m long (north-south), 0.45 m wide, and 0.17 to 0.25 m in height. Each has the rusted remnants of a metal bracket on the upper surface. These three blocks are spaced 1.0 to 1.25 m apart.

The fourth block is located 3.2 m west of the northernmost block. It is 0.85 m in length (north-south), 0.65 m wide, 0.7 m in height, and has a similar bracket on the top. There is a tall berm or retaining wall located adjacent to this block on the upslope side. This retaining wall is 6.5 m in length (north-south) and 4.5 m wide. It slopes up steeply to the west with the top being from 2.5 to 3.0 m taller than the level terrace below. Several burnt wooden beams extend out of the retaining wall.

Feature K is interpreted as the base for a metal tank. A 1944 map of this area indicates that ten steel tanks once existed on the slopes above the warehouse complex. Although the location of Feature K does not correspond to any of the tanks depicted on the map, this feature like functioned for a similar purpose and probably was constructed after 1944. No evidence of the tanks illustrated in the map was found during the examination of the area. (Haun et al. 2004:30-36)

**Figure 19. Site 22352, Feature I concrete blocks (view to northeast; from Haun et al. 2004:35).**

**Figure 20. Site 22352, Feature J railroad rail (view to northwest; from Haun et al. 2004:35).**

## Site 50-10-74-22354

Site 22352 is a displaced cattle guard located 130 meters seaward of Highway 11, southwest of the intersection of two dirt roads (see **Figure 4**). It is comprised of 11 small gauge railroad rails welded parallel to each other supported by five metal I-beams situated perpendicularly to the rails (**Figure 21**). According to Haun et al. (2004:41), the cattle guard is 3.4 meters long by 1.91 meters wide. It was interpreted as livestock control feature used to restrict the movement of cattle, built from railroad rails following the abandonment of the railroad system in the 1940s. The site is altered and in fair condition and was assessed as significant for its information content (Criterion "d") by Haun et al. (2004:86). It was recommended for no further work.

**Figure 21. Site 22354 displaced cattle guard (view to north-northeast; from Haun et al. 2004:42).**

## Site 50-10-74-22355

Site 22355 is a complex of two features associated with pumping sugar mill wastewater to ponding basins in the northeastern and southeastern portions of the project area, previously identified by Haun et al. (2004). The extent of the site is presented in **Figure 4**. The site was interpreted as a modern feature and its significance was not assessed; however it was recommended for no further work. The features of the site are described as follows:

**Feature A**

Feature A is an electrical panel consisting of a metal framework with a vertical steel wall located in the center (**Figure 22**). The steel wall is 2.4 m long (north-south), 0.2 m wide, and 2.76 m wide. The framework surrounding the wall is constructed of welded metal bars. The base of the framework is 2.5 m long (north-south) by 1.7 m wide. Electrical wires extend from the steel wall.

**Feature B**

Feature B is a large concrete box located c. 7.0 m east-southeast of Feature A. This box is 6.4 m long (west-northwest to east-southeast) by 4.6 m wide (**Figure 23**). The walls of the box are 0.25

**Figure 22. Site 22355, Feature A electrical panel (view to west; from Haun et al. 2004:43).**

**Figure 23. Site 22355, Feature B concrete box (view to southwest; from Haun et al. 2004:43).**

> m wide and 0.2 m in height above the surrounding ground surface. The interior floor of the box is a concrete slab that is 1.67 m in depth below the top of the walls. A section of 0.17 m diameter metal pipe, 5.5 m in length, is resting on top of the concrete box.
>
> The remains of a raised metal walkway are present along the southern end of the slab. This walkway is supported by a 0.15 m wide by 0.1 m high concrete curb. The walkway parallels the southern side of the box and then turns to the southwest and crosses the Site 22356 flume. The rusted remnants of a handrail are present where the walkway crosses the flume. An intact concrete pipe stanchion identical to those seen at Sites 22360 and 22367, discussed below, is located 3.2 m north of the northeastern corner of the concrete box.
>
> Site 22355 is interpreted as a water transportation system used to pump water to the two large ponding basins in the northeastern and southeastern portions of the project area. Water apparently was pumped from the flume into the Feature B concrete box and then distributed through metal pipes as evidenced by the pipe and pipe stanchion at this site and at Sites 22360 and 22367. The Feature A electrical panel likely supplied the electricity for the pumping system. (Haun et al. 2004:41-45)

## Site 50-10-74-22356

Site 22356 is an flume initially noted by Ayres (1970) and subsequently documented by Haun et al. (2004). A seaward portion of the site was also identified by Clark et al. (2013; see **Figure 4**). The flume originates outside the Haun et al. (2004) project area and extends to the east across the project area towards the ocean. There is a concrete culvert that extends beneath Highway 11 to the west that continues to the sugar mill, located on the western side of the road. It is described by Haun et al. (2004) as follows.

> The flume in the western portion of the project area is concrete-lined and averages 1.35 m wide and 0.75 m deep with 0.27 m thick walls and a dirt floor (**Figure 24**). This portion of the flume extends to the east c. 225 m where it turns into an earthen ditch. The ditch is c.1.75 m wide and 0.45 to 0.6 m deep with sloping walls. The ditch extends to the east an additional c. 400.0 m to where it meets the coastal lava escarpment. The ditch then enters a low, natural swale that empties into the ocean c. 50.0 m further east. According to Ayres (pers. comm.), this flume was used to transport sugar cane wastewater from the mill to the ocean. The use of the flume to dump waste was likely abandoned upon completion of the ponding basins. (Haun et al. 2004:44)

According to Haun et al. (2004:44), the site is altered and in fair condition. It was assessed as significant for its information content (Criterion "d") and was recommended for no further work by Haun et al. (2004:86).

## Site 50-10-74-22357

Site 22357 is a walled enclosure identified by Haun et al. (2004). It is located in the west-central portion of the Haun et al. (2004) project area in a level area impacted by cattle grazing. The structure is roughly T-shaped comprised of a wall along the southeast side and a perpendicular wall extending to the northwest (**Figure 25**). The site is described by Haun et al. (2004) below:

> The southeastern wall originates against a pahoehoe outcrop and extends to the southwest a distance of 11.9 m. This section of wall is 1.0 to 1.1 m in width and from 0.48 to 0.57m in height. The perpendicular wall originates 5.0 m southwest of the northeastern end of the first wall. This wall extends to the northwest 13.3 m, where it angles to the west for an additional 7.2 m. This wall varies in width from 0.74 to 1.1 m and in height from 0.72 to 1.07 m. Both sections of wall are constructed of stacked subangular pahoehoe cobbles and small boulders with a narrow

**Figure 24. Site 22356 flume (view to east; from Haun et al. 2004:45).**

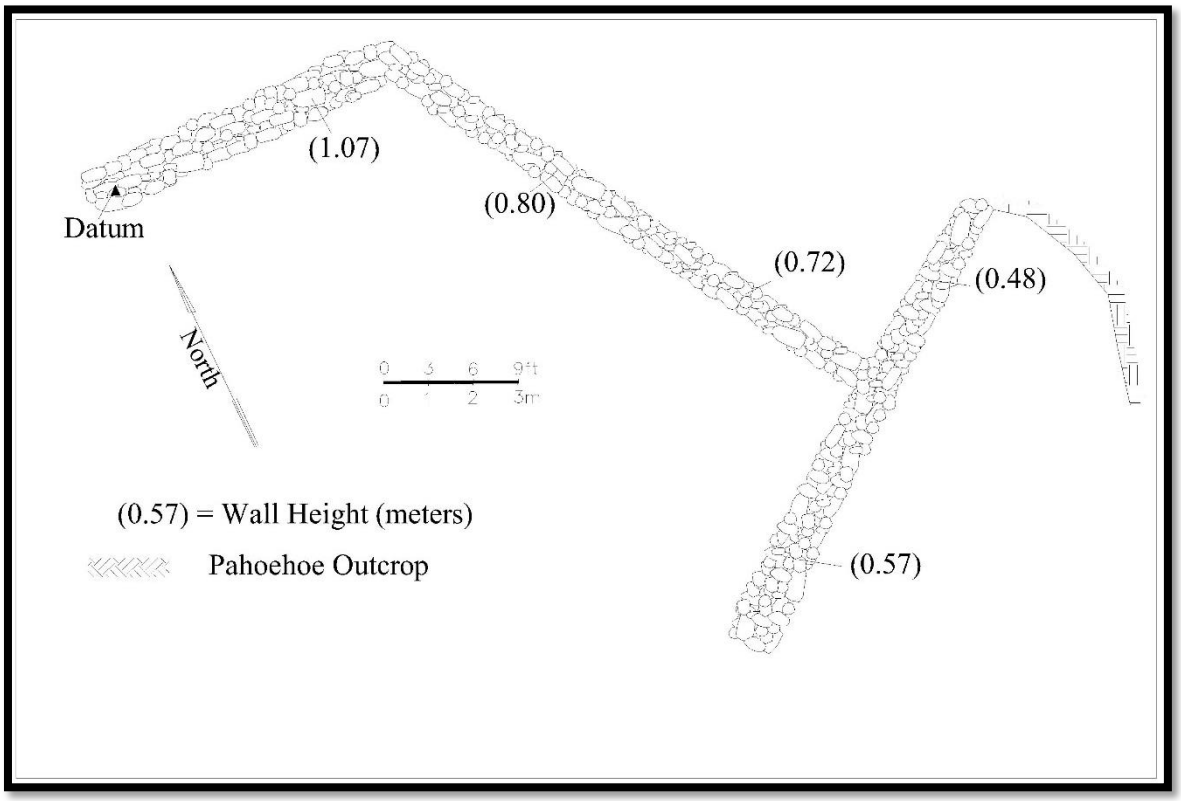


**Figure 25. Plan map of Site 22357 (from Haun et al. 2004:45).**

> core-filled interior. No cultural remains were observed. The height and method of construction of this enclosure suggests it cattle enclosure associated with historic ranching activity. (Haun et al. 2004:44)

Haun et al. (2004:44) determined that the site is partially altered and in fair condition. It was assessed as significant for its information content (Criterion "d") and was recommended for no further work by Haun et al. (2004:86).

### Site 50-10-74-22358

Site 22358 is an overhang enclosed by a stone wall previously identified by Haun et al. (2004). The entrance opens to the south the interior space measuring 2.64 meters long (east-west) and 0.6 to 1.32 meters wide and 0.39 meters high (**Figure 26**). Cultural material observed in the interior consist of broken clear glass bottles, fragments of glazed ceramics and cow bones. Additional glass bottles and debris is present on the surface of the outcrop above the overhang. These consist of brown glass *Duraglas* beer bottles, several un-marked green and clear glass bottles, a ceramic doorknob, a tin bowl, a plastic drawer from a refrigerator, and fragments of corrugated tin. The wall at the entrance is described by Haun et al. (2004) as follows:

> The stone wall is located 4.15 m south of the overhang. It encloses an area that is 4.5 m long (east-west) by 4.1 5m wide. It is bounded by a pahoehoe outcrop on the east and west, and by the overhang on the north. The surface of this enclosed area is 1.2 m below the top of the outcrop. The stone wall is slightly curved and measures 5.3 m long (east-west), from 0.44 to 0.96 m wide, and 0.35 to 0.98 m in height. It is constructed of stacked subangular pahoehoe cobbles and small boulders and is collapsed at the western end. (Haun et al. 2004:44)

According to Haun et al. (2004:44), Site 22358 is unaltered and in good condition. It was interpreted as a temporary shelter associated with ranching activity in the area and was assessed as significant for its information content (Criterion "d"). The site was recommended for no further work by Haun et al. (2004:86).

### Site 50-10-74-22359

Site 22359 is a discontinuous stone wall situated along the northern edge of a pahoehoe outcrop, identified by Haun et al. (2004; see **Figure 4**). According to Haun et al. (2004):

> From the western end, the wall extends 14.0 m to the north, turns to the east for 20.0 m, and then to the southeast for 13.0 m. From this point, the wall continues to the east for 9.5 m, and then turns to the southeast for 7.0 m. The outcrop continues to the southeast for an additional 10.0 m past this end of the wall. Site 22359 is built of piled, subangular pahoehoe cobbles and boulders (**Figure 27**). It varies in width from 0.41 to 0.7 m and in height from 0.2 to 0.72 m. No cultural remains were found in association with this wall. (Haun et al. 2004:47)

Haun et al. (2004:44) interpreted the wall as a livestock control feature used to restrict the movement of cattle. It is altered and in fair condition and was assessed as significant for its information content (Criterion "d"). The site was recommended for no further work by Haun et al. (2004:86).

### Site 50-10-74-22360

Site 22360 is a concrete pipe stanchion located on a bare pahoehoe lava flow, identified by Haun et al. (2004). It is rectangular-shaped and measures 1.22 meters by 0.61 meters at the base and ranges in height from 0.3 to 0.5 meters (**Figure 28**). A groove is located in the center of the stanchion, with a rusted metal bracket present on each side. According to Haun et al. (2004:46), the stanchion is part of a pipeline system, "…oriented in a northeast-southwest direction, or roughly parallel to the coastline. This pipeline system probably was used to transport wastewater from

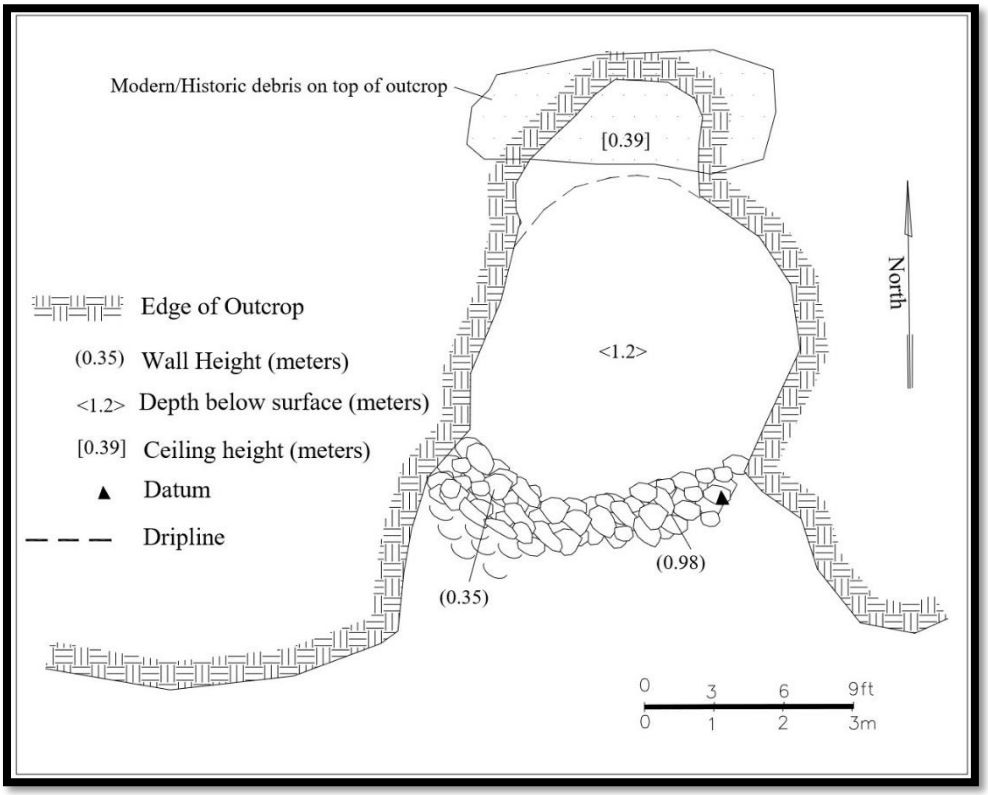


**Figure 26. Plan map of Site 22358 (from Haun et al. 2004:46).**

**Figure 27. Site 22359 stone wall (view to west; from Haun et al. 2004:46).**

**Figure 28. Site 22360 concrete pipe stanchion (view to southeast; from Haun et al. 2004:48).**

the mill." The stanchion is unaltered and in good condition. Haun et al. (2004:86) interpreted Site 22360 as a modern feature and its significance was not assessed; however it was recommended for no further work.

### Site 50-10-74-22361

Site 22361 is a cluster of three displaced objects within a bulldozer berm in the central portion of the Haun et al. (2004) survey area. They consist of two concrete blocks (0.52 meters square by 0.39 meters in height), and a metal beam (0.91 meters long, 0.26 meters wide and 0.12 meters thick), located in an area 6.0 meters long (north-south) and 2.5 meters wide. The blocks have a 0.09 meter diameter hole in the center with electrical wires protruding from them each hole. No photographs of the site are included in the Haun et al. (2004) report.

Haun et al. (2004:47) interpreted the blocks as functioning to support electrical light poles based on the wires extend from the holes, although the function of the metal beam was undetermined. The site is altered and in poor condition and was interpreted as a modern feature. Its significance was not assessed; however it was recommended for no further work by Haun et al. (2004:86).

### Site 50-10-74-22362

Site 22362 is a modified outcrop located on a bare pahoehoe lava in the east-central portion of the Haun et al. (2004) survey area. According to Haun et al. (2004:47) it is 2.7 meters long (east-west), 1.0 to 1.3 meters wide, and 0.35 meters high, built of piled subangular pahoehoe cobbles and boulders. No photograph or map of the modified outcrop is available in the Haun et al. (2004) report. It was interpreted as an agricultural clearing pile and assessed as significant for its information content (Criterion "d"). The site was recommended for no further work by Haun et al. (2004:86).

## Site 50-10-74-22363

Site 22363 is a rectangular-shaped enclosure located on a low pahoehoe outcrop in the north-central portion of the Haun et al. (2004) survey area. According to Haun et al. (2004:47), the enclosure is 3.65 meters long (northeast-southwest) and 2.7 meters wide with walls constructed of stacked subangular pahoehoe cobbles and small boulders (**Figure 29**). The walls are 0.5 to 0.71 meters wide and 0.33 to 0.62 meters high. No soil or cultural material is present inside the structure. The enclosure is unaltered and in fair condition and was interpreted as a temporary habitation structure. The site was assessed as significant for its information content (Criterion "d") and was recommended for no further work by Haun et al. (2004:86).

## Site 50-10-74-22364

Site 22364 is a cave located in the north-central portion of the Haun et al. (2004) survey area. The location of the site roughly corresponds to a possible burial cave identified by Ayres as Site B13-17. According to Ayres, this site is " a deep hole in the ground (more than 1.2 meters deep) that has been covered with stones and the entire feature surrounded with a roughly rectangular wall about 2 by 2.8 meters" (1970:7). In 1995, a DLNR-HPD Burial Program Staff member, assigned the Site SIHP Number 29343, based on review of the Ayres (1970) report. No fieldwork was conducted.

According to Haun et al. (2004:49), "Although the location of this site roughly corresponds to Ayres' (1970) Site B13-17, the physical descriptions do not match". The Site 22364 cave as recorded by Haun et al. (*ibid*) is described as follows:

> Site 22364 consists of a roughly oval-shaped hole in the bare pahoehoe lava. The cave is 1.2 m long (north-northeast to south-southwest), from 0.83 to 1.06 m wide and 1.39 m deep (**Figure 30**). The interior of the cave is also oval shaped, measuring 3.25 m long (north northeast to south southeast) and 2.55 m wide. The interior ceiling heights vary from 0.2 to 0.75 m. A pile of rubble is located at the southern end of the cave below the entrance. No cultural remains are present.
>
> The remnants of a stone wall are present on the surface, adjacent to the eastern edge of the entrance. This wall is 0.98 m long (north-south), 0.21 to 0.35 m wide, and 0.27 to 0.33 m high. No evidence of the rectangular wall noted by Ayres was present. The bare pahoehoe lava surrounding this site was examined but no bulldozer scars were observed, suggesting that the site has not been damaged. It is possible that Ayres' Site B13-17 was located in this general area but has been destroyed since his survey. The nature of the Site 22364 cave indicates that it may have served as a possible agricultural feature based on its formal type and lack of habitation debris. The low wall is positioned to serve as a windbreak and there is some soil mixed with stones in the base of the cave. (Haun et al. 2004:49)

The site is unaltered and in fair condition and was assessed as significant for its information content (Criterion "d"). It was recommended for no further work by Haun et al. (2004:86).

## Site 50-10-74-22365

Site 22365 is comprised of two modified outcrops located on a bare pahoehoe outcrop in the north-central portion of the Haun et al. (2004) survey area. No photograph or map of the site is available in the Haun et al. (2004) report. The features of the site are described by Haun et al. (2004) as follows:

> Both features are irregular in shape and are constructed of piled subangular pahoehoe cobbles and small boulders. No cultural remains are present. Feature A is 3.1 m in length (northwest-southeast), 1.5 to 1.9 m in width, and 0.35 m in height. Feature B is situated c. 9.0 m east-northeast

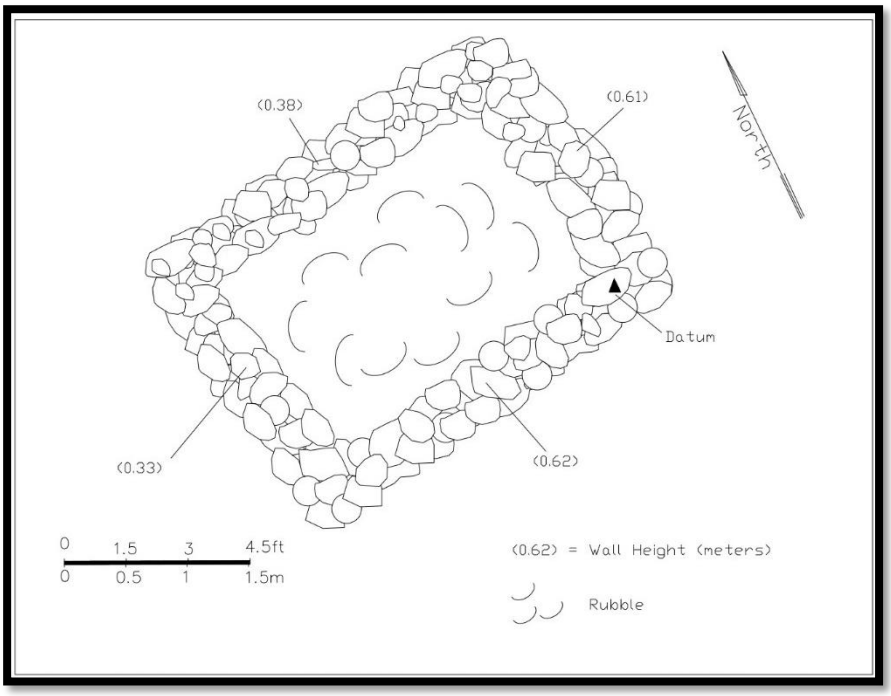


**Figure 29. Plan map of Site 22363 (from Haun et al. 2004:48).**

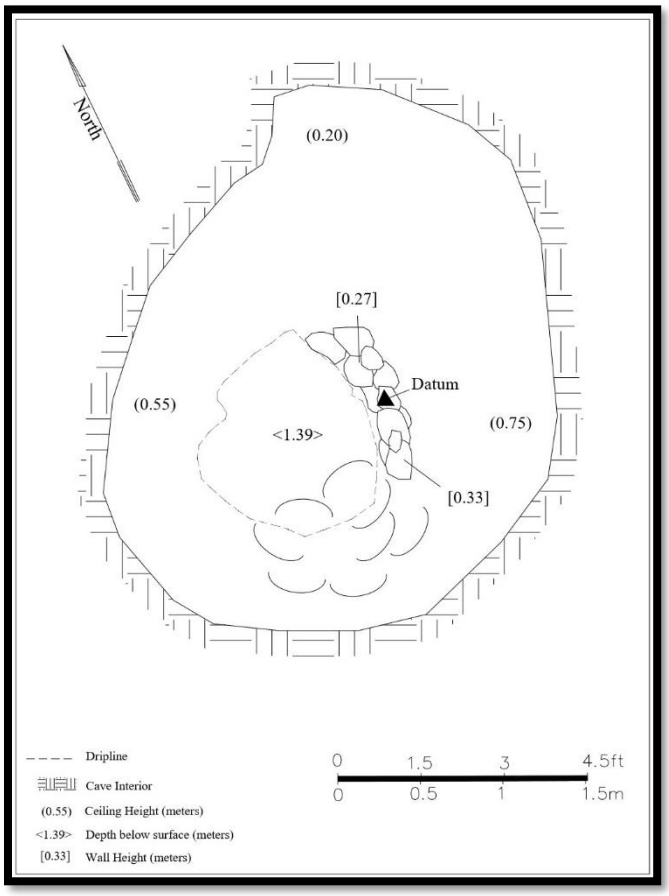


**Figure 30. Plan map of Site 22364 (from Haun et al. 2004:50).**

> of Feature A. This modified outcrop is 3.5 m in length (north-south), 1.75 to 2.7 m in width, and 0.4 m in height. These features are interpreted to be agricultural clearing mounds based on their informal construction and lack of cultural remains. (Haun et al. 2004:49)

The features were interpreted to be agricultural clearing mounds by Haun et al. (2004) based on their informal construction and lack of cultural material. remains. They are unaltered and in fair condition and were assessed as significant for their information content (Criterion "d"). The site was recommended for no further work by Haun et al. (2004:86).

## Site 50-10-74-22366

Site 22366 is an irregularly shaped mound in an area of uneven pahoehoe lava, initially identified by Haun et al. (2004). It is 2.4 meters long (north-south), 1.0 to 1.2 meters wide, and 0.38 meters in height, built of piled subangular pahoehoe cobbles. No cultural material is present. The site was interpreted as an agricultural clearing mound based on its informal method of construction and absence of cultural material. No photograph or map of the mound is available in the Haun et al. (2004) report. It is unaltered and in fair condition and was assessed as significant for its information content (Criterion "d"). The site was recommended for no further work by Haun et al. (2004:86).

## Site 50-10-74-22367

Site 22367 is a depression in a pahoehoe outcrop partially enclosed by stone walls located in the west-central portion of the Haun et al. (2004) survey area. the site is described by Haun et al. (2004) as follows:

> The north and south sides of the enclosure consist of stone walls and the eastern and western sides are formed by exposed outcrop. The overall dimensions of the enclosure are 13.5 m long (east-west) and 8.0 to 10.5 m wide (**Figure 31**). The northern wall is 11.2 m long (east-west), 0.75 to 1.1 m wide, and 0.53 to 0.9 m in height. This wall is built of piled subangular pahoehoe cobbles and small boulders. The southern wall is 12.1 m in length (northeast-southwest), 0.7 to 1.0 m wide, and 0.55 to 0.85 m in height. It is built of stacked cobbles and small boulders.

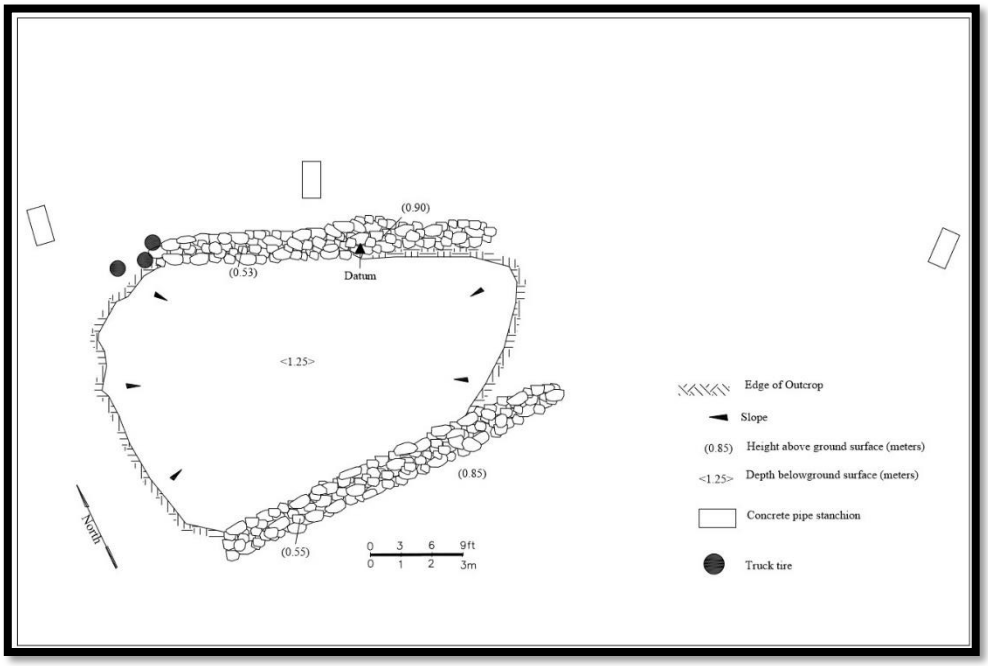


**Figure 31. Plan map of Site 22367 (from Haun et al. 2004:51).**

> The interior floor of the enclosure is 1.25 m below the surrounding outcrop. The floor is a thin deposit of soil covered with grass. No cultural remains were observed within the enclosure. Several truck tires are located adjacent to the western end of the northern wall. There are three, intact concrete pipe stanchions above the enclosure that are identical to the Site 22360 stanchion. These are 1.2 m in length (north-south) by 0.60 m wide, and have a 0.35 m diameter groove in the center. The first stanchion is located 3.0 m west of the west end of the northern wall. The second is 8.5 m east of the first, and the third is 19.5 m east of the second. The position of the pipe stanchions indicates the pipeline of which they area associated was oriented in an east-west direction. (Haun et al. 2004:49-52)

The site was interpreted as a livestock enclosure associated with historic/modern ranching activity. It is unaltered and in fair condition and was assessed as significant for its information content (Criterion "d"). The site was recommended for no further work by Haun et al. (2004:86).

### Site 50-10-74-22368

Site 22366 is an irregularly shaped mound in a level area along the western boundary of the Haun et al. (2004) survey area. It is 3.2 meters long (northwest-southeast), 1.65 meters wide, and 0.48 meters high, built of piled subangular pahoehoe cobbles and small boulders. No cultural remains are present. The site was interpreted as an agricultural clearing mound based on its informal method of construction and absence of cultural material. No photograph or map of the mound is available in the Haun et al. (2004) report. It is unaltered and in fair condition and was assessed as significant for its information content (Criterion "d"). The site was recommended for no further work by Haun et al. (2004:86).

### Site 50-10-74-22369

Site 22369 is a scatter of 100 yellow and red bricks located in a level area in the northwestern portion of the Haun et al. (2004) survey area. The material is located in an area 34.0 meters long (east-west) and 20.0 meters wide. According to Haun et al. (2004:52), "The yellow bricks are 0.23 m in length, 0.11 m wide, and 0.07 m thick. The word "Stockton" is imprinted on one side of the bricks. The red bricks are 0.21 m long, 0.06 m wide, and 0.06 m thick. Many of the bricks have mortar adhering to them". Site 22369 is altered and in poor condition and potentially represents the remains of a destroyed brick structure. Examples of the bricks are presented in **Figure 32**. The site was interpreted as a modern feature and its significance was not assessed; however it was recommended for no further work by Haun et al. (2004:86).

### Site 50-10-74-22370

Site 22369 is a scatter of glass bottles located in a level grassy area in the northwestern portion of the Haun et al. (2004) survey area. The material is located in an area 9.1 meters in length (east-west) and 6.0 meters wide. According to Haun et al. (2004:52), "The bottles include one clear glass *Coca-Cola* bottle with "1959" on the side, five brown glass *Duraglas* beer bottles, one small blue glass medicine bottle, and one clear glass jug." Site 22370 is unaltered and in poor condition and interpreted as a trash dump. Examples of the bottles are presented in **Figure 33**. The site was interpreted as a modern feature and its significance was not assessed; however it was recommended for no further work by Haun et al. (2004:86).

### Site 50-10-74-22371

Site 22371 is an overhang enclosed by a stone wall in the north-central portion of the Haun et al. (2004) survey area in an area of uneven pahoehoe lava. The site is described by Haun et al. (2004) as follows:

**Figure 32. Site 22369 bricks (from Haun et al. 2004:53).**

**Figure 33. Site 22370 bottles (from Haun et al. 2004:53).**

> The overhang opens to the south and is roughly U-shaped. It ranges in length from 2.7 m (northeast-southwest) to 3.8 m (north-south), and 0.3 to 0.95 m in width (**Figure 34**). The dripline height ranges from 0.65 to 1.04 m and the interior ceiling height ranges from 0.25 to 0.76 m.
>
> An oval-shaped enclosure is formed between the overhang's entrance and a stacked stone wall. This enclosed space is 3.3 m in length (north-northeast to south-southwest) and 1.75 to 2.5 m wide. The floor of the enclosure is 1.0 m below the surrounding ground surface. The stone wall is slightly curved and is 4.5 m long (north northwest to south southeast). It is constructed of stacked subangular pahoehoe cobbles and small boulders. The wall ranges from 0.55 to 1.2 m in width and 0.56 to 0.72 m in height. The site is in good condition and is unaltered. No cultural remains were observed at this site. A thin deposit of soil (less than 0.05 m) was present. (Haun et al. 2004:52-55)

Site 22371 was interpreted as a temporary habitation site by Haun et al. (2004:55) based on its small area and method of construction. It is unaltered and in fair condition and was assessed as significant for its information content (Criterion "d"). The site was recommended for no further work by Haun et al. (2004:86).

### Site 50-10-74-22372

Site 22372 is a scatter of material in a level grassy area in the northwestern portion of the Haun et al. (2004) survey area. The materials are scattered over an area measuring 30 meters long (north-south) and 10 meters wide. According to Haun et al. (2004:55), "The materials at the site consist of 25 brown glass *Duraglas* beer bottles, four clear glass one-half gallon jugs, one brown glass *Purex* bottle, one clear glass *Coca-Cola* bottle with "1959" on the side, several unmarked clear glass bottles, a metal cylinder with rounded ends (0.67 m long by 0.29 m diameter), a metal box (0.9 m long, 0.72 m wide and 0.22 m tall), and a metal pipe and valve. The pipe is 0.96 m long and 0.18 m in diameter. The valve is 0.32 m in diameter and 0.4 m tall." Examples of the materials at the site are presented in **Figure 35.** The site was interpreted as a modern feature and its significance was not assessed; however it was recommended for no further work by Haun et al. (2004:86).

### Site 50-10-74-22373

Site 22373 is a scatter of material in the northwestern portion of the Haun et al. (2004) survey area. The materials are scattered over an area measuring 35 meters long (east-west) and 10 meters wide. According to Haun et al. (2004:55), "The debris includes an old cash register, various machine parts, 15 *Coca-Cola* bottles with "1956" and "1957" imprinted on the side, 10 brown glass *Duraglas* beer bottles, two brown glass *Clorox bottles*, five clear glass canning jars, two clear glass liquor bottles, fragments of asphalt and concrete, and scattered unidentifiable metal debris." Examples of the materials at the site are presented in **Figure 36**. The site was interpreted as a modern feature and its significance was not assessed; however it was recommended for no further work by Haun et al. (2004:86).

### Site 50-10-74-22374

Site 22374 is an earthen enclosure located in the northern portion of the Haun et al. (2004) survey area. No photograph or map of the enclosure is available in the Haun et al. (2004) report. The site is described by Haun et al. (2004) as follows:

> The enclosure is roughly oval in shape with overall dimensions of 18.8 m long (northeast-southwest) by 16.1 m wide. The walls are comprised of mounded soil, ranging in width from 2.5 to 4.2 m, and in height from 1.35 to 1.7 m. There is a 2.5 m wide opening into the enclosure at the southeast corner. An overgrown dirt road extends by this opening in a north-south direction 3.0 m to the east. No cultural remains are present. (Haun et al. 2004:55)

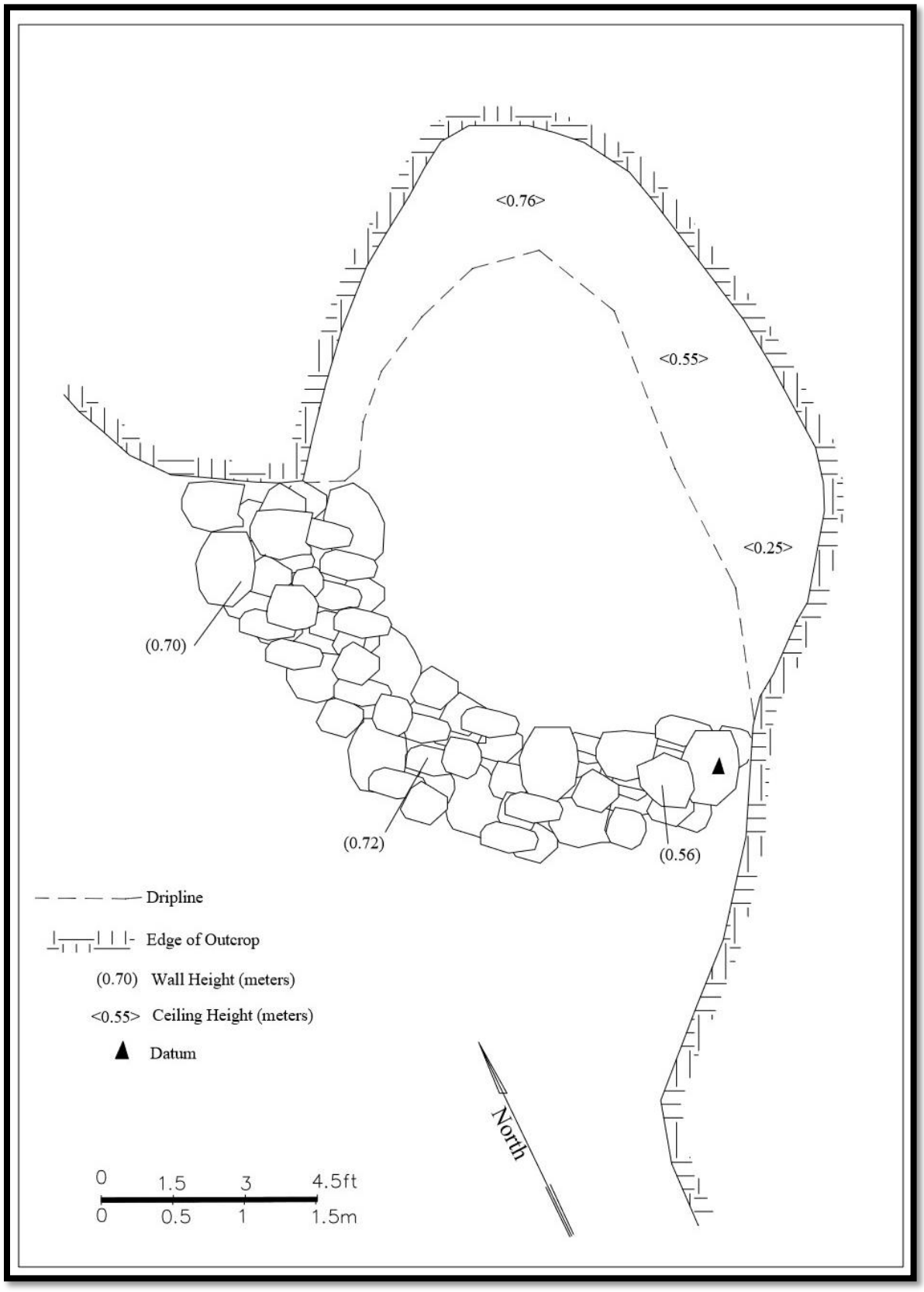


**Figure 34. Plan map of Site 22371 (from Haun et al. (2004:54).**

**Figure 35. Site 22373 bottles (from Haun et al. 2004:56).**

**Figure 36. Site 22374 bottles and cash register (from Haun et al. 2004:56).**

Site 22374 was interpreted as a possible animal enclosure utilized in conjunction with historic/modern ranching activity. It is unaltered and in fair condition and was assessed as significant for its information content (Criterion "d"). The site was recommended for no further work by Haun et al. (2004:86).

## Site 50-10-74-22375

Site 22375 is a complex of two mounds located in the northwestern portion of the Haun et al. (2004) survey area, in an area extensively impacted by cattle grazing activity. The site is described by Haun et al. (2004) as follows:

> Both mounds are oval in shape and are constructed of crudely piled subangular pahoehoe cobbles and small boulders. They are in fair condition and appear unaltered. Feature A, located closest to the road, is 2.8 m long (east-northeast to west-southwest), 1.95 m wide, and 0.7 m in height (**Figure 37**). Feature B is located 11.0 m east-southeast of Feature A. It is 2.1 m long (north-south), 1.7 m wide, and 0.75 m in height. No cultural remains were found on the mounds, although a basalt adze fragment was identified in the area between the two mounds (**Figure 38**). The adze measures 0.11 m long, 0.05 m wide and 0.04 m thick. The adze was incomplete. Flake scares and evidence of grinding are present at the poll end (Haun et al. 2004:55)

The mounds at Site 22375 were interpreted as agricultural clearing features based on their informal construction. The site is unaltered and in fair condition and was assessed as significant for its information content (Criterion "d"). The site was recommended for no further work by Haun et al. (2004:86).

## Site 50-10-74-22376

Site 22376 is a complex of five features located in the north-central portion of the Haun et al. (2004) survey area. Portions of the site were initially identified by Ayres as Sites B13-8, -9, -10 and -13. The site was documented by Haun et al. (2004) who identified two platforms (Features A and B), an enclosure (Feature C), a mound (Feature D), and a wall (Feature E). **Figure 39** illustrates the Site 22376 complex. The features are described by Haun et al. (2004) as follows:

> **Feature A**
>
> Feature A is a low platform located at the eastern end of the site. This platform was initially documented by Ayres as Site B13-8 (1970:5). It is rectangular in shape and is 8.1 m long (west-northwest to east-southeast) and from 5.6 to 7.1 m wide. The structure has a border of aligned subangular pahoehoe boulders with the interior consisting of a pavement of small cobbles and pebbles. The height of the platform varies from 0.22 to 0.34 m. A small depression on the surface of the platform is located near the northeastern corner. This measures 0.32 m in diameter by 0.27 m deep and probably represents a posthole. *Opihi* and *cowrie* shells and scattered waterworn basalt stones (*ili*) were observed on the surface.
>
> There is an area of soil located near the center of the platform. This area is 3.14 m long (west northwest-east southeast) by 2.05 m wide. Feature A is assigned a permanent habitation function. This is based on its relatively large size of this structure (57.5 sq m), its formal type, and its proximity to other permanent habitation features.
>
> **Feature B**
>
> Feature B is a platform situated adjacent to Feature A, 0.2 to 0.61 m to the west-northwest. This platform was first identified by Ayres as Site B13-9 (1970:5). The platform is rectangular-shaped and measures 8.2 m long (west-northwest to east-southeast) by 5.5 m wide. The height of the platform ranges from 0.31 to 0.7 m. The sides of the platform are built of stacked subangular

**Figure 37. Site 22375, Feature A mound (view to southeast; from Haun et al. 2004:57).**

**Figure 38. Basalt adze from Site 22375 (from Haun et al. 2004:57).**

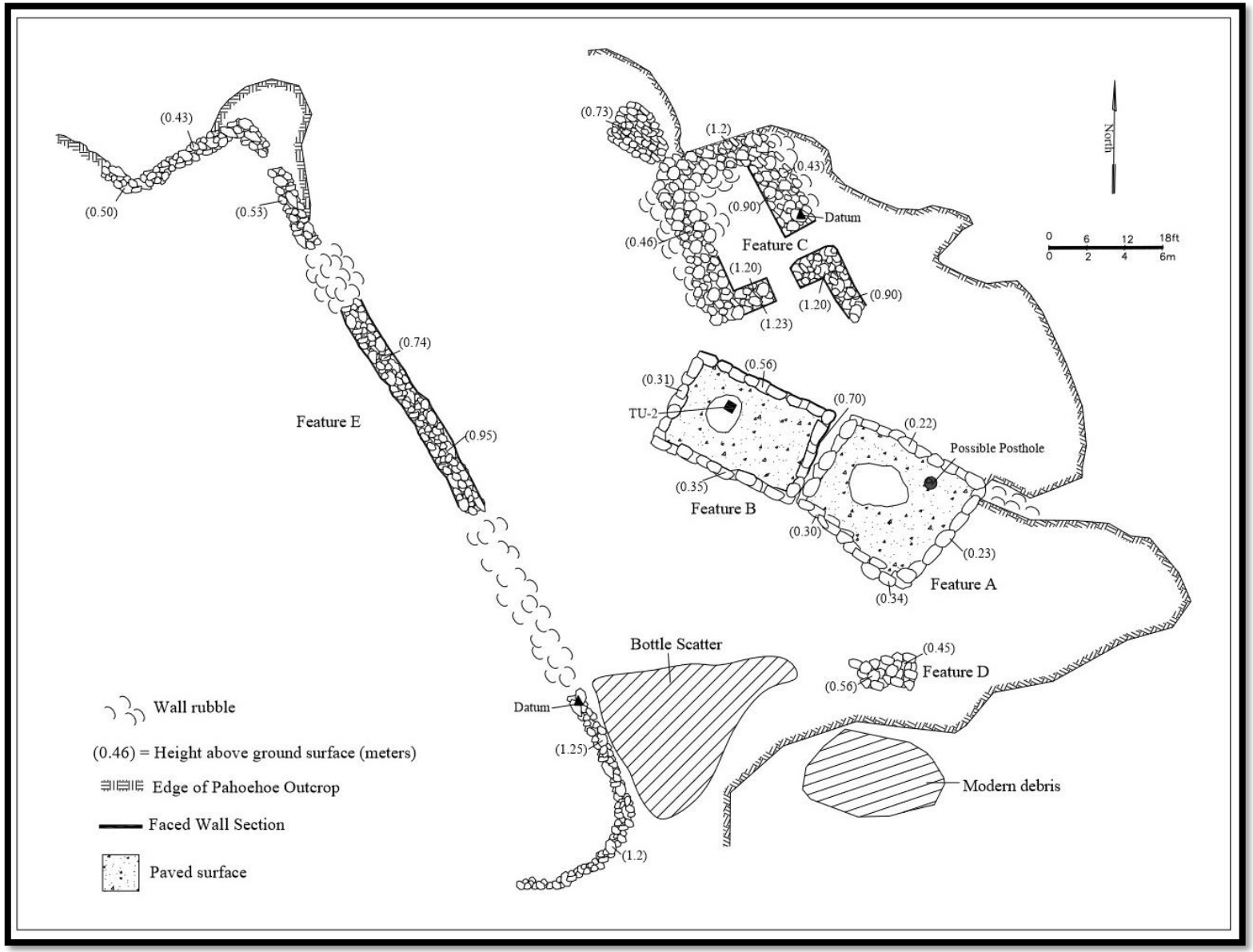


**Figure 39. Plan map of Site 22376 (from Haun et al. (2004:58).**

pahoehoe large cobbles and boulders. The northern and eastern sides of the structure are faced. The surface of the platform is level and is paved with small cobbles and pebbles. A waterworn basalt cobble, sun bleached cowrie shell, and a fragment of a ceramic cup or bowl were observed on the surface of the structure.

There is an area of soil within the paved area on top of the structure. It is 2.0 m long (north-south) by 1.6 m wide. A 0.4 by 0.4 m test unit (TU-2) was excavated into this soil area during the current study. The excavation of this unit revealed a layer of very dark grayish brown silt that ranged in depth from 0.17 to 0.2 m below surface (Layer I). Layer I yielded 6.35 grams of invertebrate remains (N=5, MNI=3). The three taxa identified are Strombidae *Strombus sp.*, Cypraidae *Cypraea sp.*, and Neritidae *Nerita picea*. *Kukui* nutshells were also recovered.

Layer I was underlain by a gray ashy silt that ranged in thickness from 0.06 to 0.22 m (Layer II). A flat basalt slab, measuring 0.25 m in diameter was identified 0.05 m into the Layer II deposit. A small oval-shaped ash pit was present directly beneath this slab. This pit measured 0.18 m long (north-south), 0.15 m wide, and 0.05 m in thickness. Layer II yielded a small fraction of unidentified invertebrate remains (0.9 g, N=1). Both bird and fish bone are present in varying quantities. The bird bones represented a small bird with only one element present. Over 100 small fish bone fragments and scales, all non-diagnostic as to taxa, are also present and weighed 3.60 grams. Charcoal was collected from this layer and submitted for radiometric age determination and yielded a modern result.

The lower portion of Layer II extended into a layer of loosely packed subangular basalt cobbles and small boulders, which is the base of the platform fill (Layer III). Bedrock was observed below this stone layer. Feature B is interpreted as a permanent habitation structure based on its formal type, its large area (45.1 sq m), and substantial construction (faced walls and paving).

**Feature C**

Feature C is an enclosure located adjacent to Feature B 2.5 m to the northwest. The enclosure was previously documented by Ayres as Site B13-10 (1970:3). The structure is roughly rectangular in shape and measures 9.1 m long (north-northwest to south-southeast) by 7.7 m wide. The walls of the structure are built of stacked subangular pahoehoe cobbles and small boulders ranging in width from 1.3 to 1.65 m and in height from 0.43 to 1.23 m. The wall is collapsed along the southwestern and northeast sides. Intact, faced walls are present along the eastern portion of the interior and at the southeastern end. No cultural remains were observed within or around the enclosure.

There are two openings into the structure, one in the center of the southeastern wall and one in the northeastern wall. The sides of these entrances are both faced. The southeastern entrance is 1.31 m wide and the northeastern entrance is 1.25 m wide. There is a wall extension southeast from the southeastern corner of the structure. It is 2.75 m long, 1.32 m wide and 0.9 m in height. An oval-shaped mound is situated adjacent to the northwest corner of the enclosure. This mound has a domed surface and measures 3.45 m long (northwest-southeast), 2.4 m wide, and 0.73 m in height. It is constructed of piled pahoehoe cobbles and small boulders. Feature C is assigned a permanent habitation function based on its area (70.1 sq m) and substantial construction (faced walls).

**Feature D**

Feature D is an oval-shaped mound located 3.25 m south of Feature A. This mound was initially identified by Ayres (1970) as Site B13-65. The mound is 3.05 m long (east-west), 1.52 to 1.6 m wide, and 0.45 to 0.56 m in height. The mound is built of piled subangular pahoehoe cobbles and small boulders. Marine shells including *opihi, pipipi*, and *cowrie,* were noted on and around the mound.

The mound is located adjacent to the edge of a pahoehoe outcrop that drops 1.5 m to the south. A variety of historic/modern debris is present below the drop-off, in an area 7.5 m long (east-west) by 4.0 m wide. These materials include a stove burner, several metal boxes, corrugated tin and numerous brown glass beer bottles. Feature D is interpreted as an ancillary feature associated with the permanent habitation of this site.

**Feature E**

Feature E is a stone wall located 10.0 m west of Feature B. This feature was initially documented by Ayres as Site B13-13 (1970). The southern end of the wall is curved, extending to the northeast 4.5 m, and then angling to the northwest for 6.75 m. This portion of the feature is comprised of stacked subangular pahoehoe cobbles and boulders. The wall ranges from 0.5 to 0.85 m in width and 1.2 to 1.25 m in height. A large scatter of hundreds of brown glass beer bottles is located adjacent to this section of wall (**Figure 40**). This scatter is 9.5 m long (east-west) and from 1.3 to 7.75 m wide.

**Figure 40. Site 22376, Feature E bottles (from Haun et al. 2004:60)**

An area of scattered stones is present at the northwest end of the first wall section. It probably is an area of wall collapse. This collapsed section is 10.25 m long (northwest-southeast). The wall continues to the northwest from the collapsed section a distance of 11.7 m. This portion of the

> feature is built of stacked and faced cobbles and small boulders, ranging in width from 1.0 to 1.3 m, and in height from 0.74 to 0.95 m. A second area of wall collapse, 3.4 m long, is located at the northwest end of this section. The wall continues to the northwest from this collapse 4.1 m where a 0.8 m wide break is present. It continues on the northwest side of the break, extending 2.0 m to the northwest, and then angling to the southwest for 5.75 m. The wall then turns to the northwest for 1.5 m where it terminates against a low pahoehoe outcrop. This northern section of wall is constructed of piled cobbles and small boulders. The wall is 0.7 to 0.85 m wide and 0.43 to 0.5 m high. No prehistoric cultural remains were found in association with this wall. Feature E likely functioned as part of a former garden enclosure associated with Site 22376. The wall partially encloses a depression. The other sides of the depression exhibit evidence of bulldozing. (Haun et al. 2004:55-61)

Site 22376 was interpreted as a complex of permanent habitation features and was unaltered and in fair to good condition. The site was assessed as significant as an excellent site type example (Criterion "c") and for its information content (Criterion "d"), and was recommended for preservation by Haun et al. (2004:86).

## Site 50-10-74-22377

Site 22377 is a complex of two petroglyphs located on a pahoehoe outcrop in the north-central portion of the Haun et al. (2004) survey area. The features are pecked into the surface outcrop and are depicted in **Figure 41**. The petroglyphs are described by Haun et al. (2004) below:

> Feature A is an anthropomorphic figure located in the center of the outcrop. It consists of a head, arms, torso, and legs. Feature A measures 0.38 m long from the top of the head to the base of the feet with an arm span of 0.36 m. Feature B is a U-shaped petroglyph located 1.7 m north-northeast of Feature A. The U-shape is 0.31 m long and 0.12 m wide, and is open at the southeastern end. (Haun et al. 2004:62)

The Site 22377 petroglyphs were interpreted as examples of Hawaiian rock art and are unaltered and in good condition. The site was assessed as significant as an excellent site type example (Criterion "c") and for its information content (Criterion "d"), and was recommended for preservation by Haun et al. (2004:86).

**Site 50-10-74-22378**

Site 22378 is a complex of three petroglyphs located on a pahoehoe outcrop in the northeastern portion of the Haun et al. (2004) survey area. Portions of the site were initially identified by Rosendahl (1986); however, they were not recorded as they were outside the boundary of his project area. The features are pecked into the surface outcrop and are depicted in **Figure 42**. The petroglyphs are described by Haun et al. (2004) below:

> Feature A is an incomplete anthropomorphic figure located on the northern side of the outcrop. This petroglyph was identified during the current study. The head, arms and upper torso are present. The figure's arm span measures 0.51 m and it is 0.3 m from the top of the head to the base of the torso.
>
> Feature B is a second anthropomorphic figure located on the northeastern side of the outcrop 13.0 m southwest of Feature A. This petroglyph was initially documented by Rosendahl (1986:6). It measures 0.55 m from head to foot and is 0.23 m in width. The figure is carrying an object in its right hand that appears to be stick with a bag attached to it. The stick is 0.32 m long and the bag is 0.06 m in diameter.

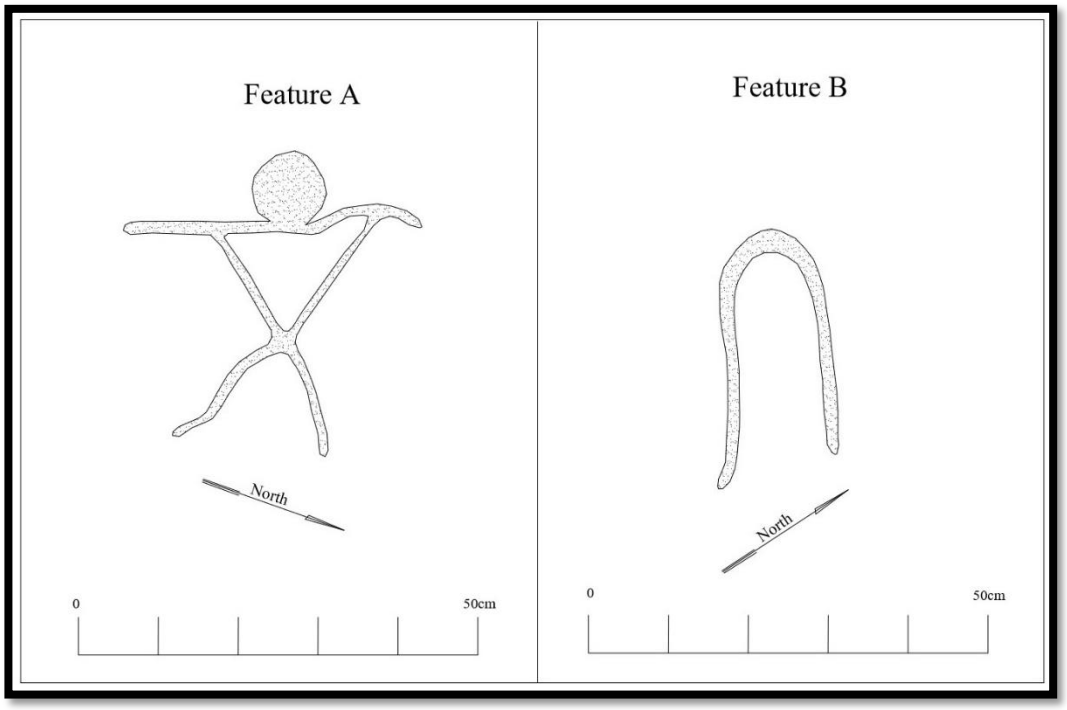


**Figure 41. Site 22377 petroglyphs (from Haun et al. 2004:63).**

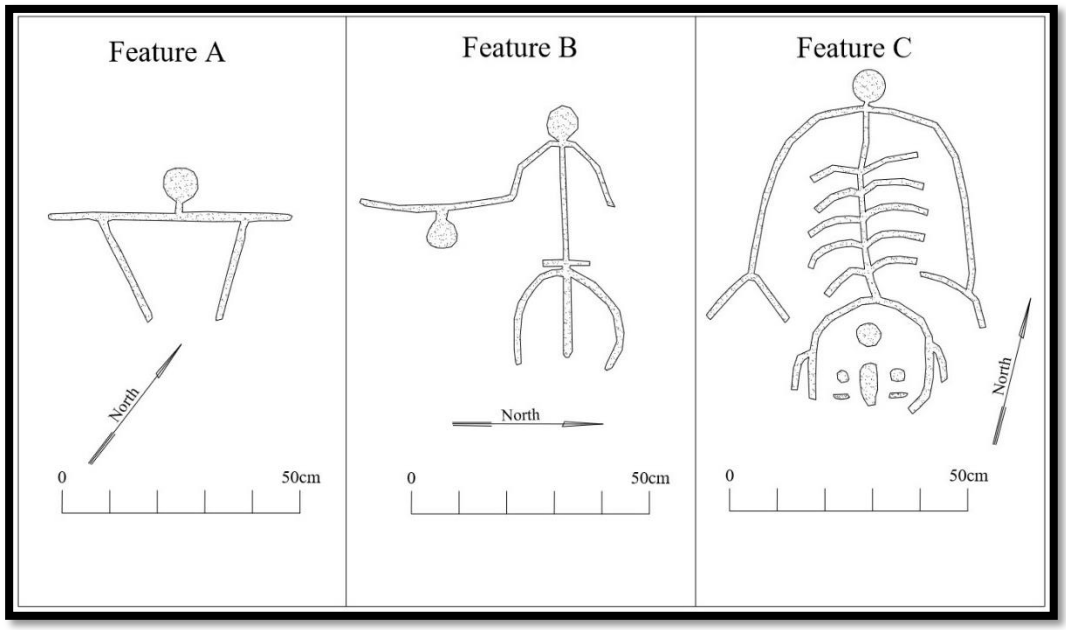


**Figure 42. Site 22378 petroglyphs (from Haun et al. 2004:63).**

> Feature C was first documented by Rosendahl as representing a birthing scene (1986:6). It is located adjacent to Feature B, 0.85 m to the northwest. The petroglyph consists of an anthropomorphic figure, with well-defined head, arms, legs and torso. It is 0.71 m long by 0.58 m wide. (Haun et al. 2004:62)

The Site 22378 petroglyphs were interpreted as examples of Hawaiian rock art and are unaltered and in fair condition. The site was assessed as significant as an excellent site type example (Criterion "c") and for its information content (Criterion "d"), and was recommended for preservation by Haun et al. (2004:86).

## Site 50-10-74-22379

Site 22379 is a large platform located in the north-central portion of the Haun et al. (2004) survey area. The site was initially identified by Ayres as Site B13-7 (1970) and subsequently documented by Haun et al. (2004). The site is described by Haun et al. (2004) as follows:

> It is rectangular-shaped, 9.52 m long (north-northeast to south-southwest), 6.95 to 8.4 m wide, and 0.45 to 0.71 m in height (**Figure 43**). The sides of the platform are faced and built of stacked subangular pahoehoe cobbles and small boulders. The interior is level and paved with small cobbles (0.05 to 0.2 m diameter). A piece of waterworn coral and a *cowrie* shell were noted on the platform's surface.
>
> A 1.0 by 1.0 m test unit (TU-1) was excavated into the surface of the platform during the study. The unit was situated along the eastern wall at the northern end. The excavation of this unit revealed a stone architectural layer (Layer I) above two soil deposits (Layers II and III). Layer I was comprised of a layer of tightly packed small to large cobbles with small subangular basalt boulders along the eastern side of the feature. Layer I ranged from 0.46 to 0.55 cm in thickness. Charcoal was recovered from the base of the wall at the interface between Layers I and II. This charcoal was submitted for radiometric age determination, and yielded a three potential calibrated age ranges of AD 1450-1685, 1735-1810, and 1925-1950. *Kukui* nutshells and a waterworn basalt pebble were also collected.
>
> Layer II consisted of a dark grayish brown silt loam, ranging in thickness from 0.03 to 0.08 m. Cultural remains recovered from this deposit consisted of marine shell, *kukui* nut shells, several '*ili 'ili* and charcoal. The shell remains consist of 0.30 grams of Patellidae *Patella sp*. A sample of charcoal was submitted for radiocarbon dating, producing a calibrated age range of AD 1435-1645. Layer III was noted in several pockets beneath Layer II and above bedrock. This soil consisted of a very dark grayish brown clay silt and contained no cultural remains. The excavation of TU-1 was terminated on bedrock. (Haun et al. 2004:62)

Site 22379 was interpreted as a permanent habitation structure based on its large area (80.0 sq meters) and substantial construction (faced walls and paving). It is unaltered and in good condition. The site was assessed as significant as an excellent site type example (Criterion "c") and for its information content (Criterion "d"), and was recommended for preservation by Haun et al. (2004:86).

## Site 50-10-74-22380

Site 22380 is a complex of two probable burial platforms (Features A and B) located in the north-central portion of the Haun et al. (2004) survey area. The features were initially identified by Ayres (1970) and subsequently documented by Haun et al. (2004). The extent of the site is depicted in **Figure 44**. The features are described by Haun et al. (2004) as follows:

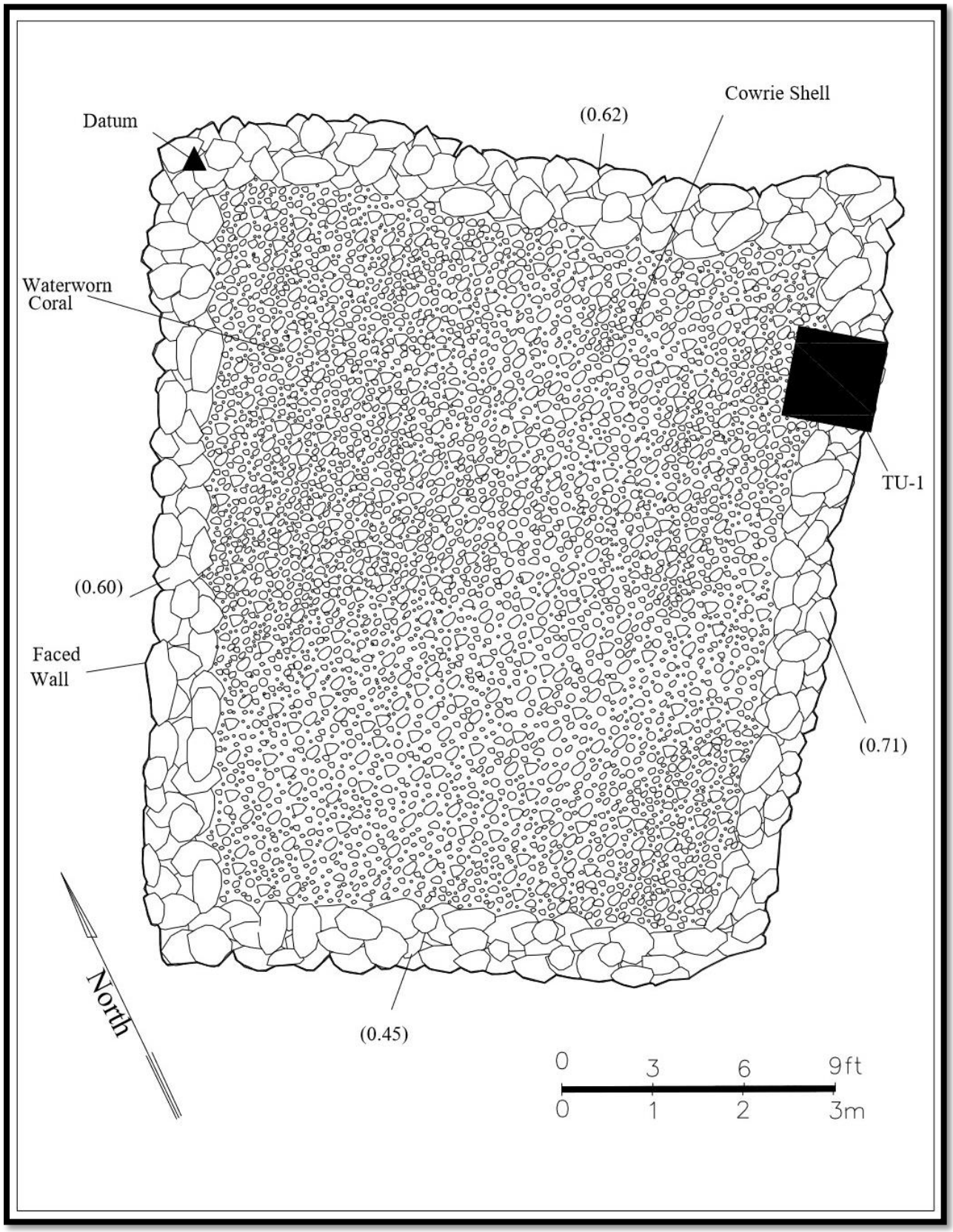


**Figure 43. Plan map of Site 22379 (from Haun et al. 2004:64).**

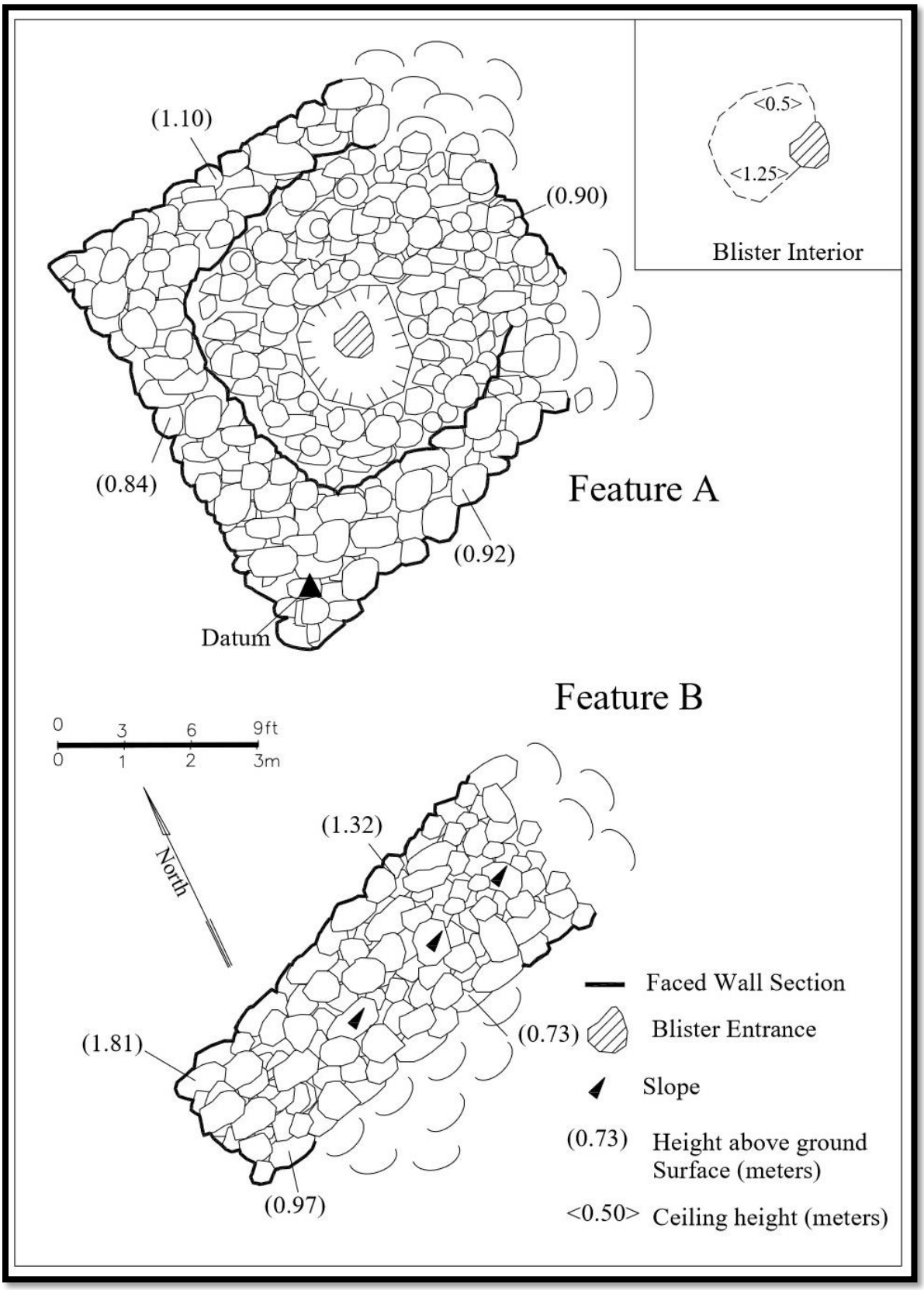


**Figure 44. Plan map of Site 22380 (from Haun et al. 2004:67).**

**Feature A**

Feature A is a well-constructed platform at the northern end of the site. This platform was initially identified by Ayres as a possible burial platform (Site B13-5) although little descriptive information was presented (1970:6). The platform is roughly square measuring 8.8 m long (north-south) by 6.4 m wide. The sides of the platform are constructed of stacked and faced subangular pahoehoe cobbles and small boulders ranging in height from 0.84 to 1.1 m. Although overall the structure is in good condition, some wall collapse was noted at the north and eastern corners.

The surface of the platform is tiered. The upper level extends around the perimeter of the platform ranging in width from 0.81 to 1.6 m. This raised area is level and is crudely paved with cobbles. Several pieces of branch coral are present on the surface. The edge of this level area is faced and is 0.25 to 0.37 m higher than the interior level. The surface of the interior level is uneven and slopes slightly to the center of the platform. There is a depression in the center that is 1.7 m long by 1.62 m wide. The platform was constructed over a small lava blister, which it probably concealed prior to its disturbance. The interior of the blister is nearly filled with stone. A single human bone, a tarsal, is present just inside the blister opening. The bone is a navicular. The opening is 1.06 m below the top of the platform, at the base of the depression (**Figure 45**). The entrance is 0.7 m long by 0.55 m wide. The interior of the cave is oval-shaped and measures 1.85 m long (east-northeast to west-southwest) by 1.33 m wide. The ceiling heights vary from 0.5 m near the entrance to 1.25 m at the southern end.

Feature A is interpreted as a burial platform. This is based on the structure's formal type and on the presence of human remains. The exposed cave entrance and presence of a single bone suggests that the burial may have been removed.

**Feature B**

Feature B is a well-built linear platform located 3.0 m south of Feature A. This platform was initially identified by Ayres as a possible burial platform (Site B13-6) (1970:6). The platform is 6.8 m long (east-west) and 2.1 to 2.75 m wide (**Figure 46**). The surface of the platform slopes to the east with the end measuring 1.81 m in height and the eastern end 0.73 to 1.32 m. This sloping surface may be the result of disturbance to the structure, as scattered stones are present around the platform. The platform is constructed of stacked subangular pahoehoe cobbles and small boulders, with faced sides. Numerous pieces of branch coral were observed on the surface of the platform, and wedged between the stones in the northern face.

Feature B is assigned a burial function. This interpretation is based on the size and well-built nature of the structure and on the presence of the branch coral. No testing was undertaken at Feature B during the current study because of the fragile nature of the structure. Dismantling the platform would likely have resulted in its collapse. (Haun et al. 2004:66-69)

Site 22380 was interpreted as a burial complex based on the human remains at Feature A and the nature and appearance of the two structures. The site is altered and in fair condition. The site was assessed as significant as an excellent site type example (Criterion "c"), for its information content (Criterion "d"), and for its cultural value (Criterion "e"), and was recommended for preservation by Haun et al. (2004:86).

**Figure 45. Site 22380, Feature A cave entrance (view to southwest; from Haun et al. 2004:68)**

**Figure 46. Site 22380, Feature B platform (view to southwest; from Haun et al. 2004:68)**

## Site 50-10-74-22381

Site 22381 is a complex of three mounds located in the north-central portion of the Haun et al. (2004) survey area. No map of photograph of the features is presented in the Haun et al. (2004) report. The site is described by Haun et al. (2004) as follows:

> The mounds are each constructed of piled subangular pahoehoe cobbles and small boulders. The mounds are unaltered and in fair condition. Feature A is located at the *mauka* end of the site. It is irregularly shaped and is 2.15 m long (north-south), 1.0 to 1.75 m wide, and 0.65 m wide. Feature B is situated 8.0 m east of Feature A. This mound is oval in shape and is 2.75 m long (north-northeast to south-southwest), 2.4 m wide, and 0.4 m in height. Feature C is located 31.0 m north-northeast of Feature B. It is oval-shaped and measures 1.5 m long (east-west), 1.0 m wide, and 0.42 m tall. No cultural remains are present. These mounds may represent prehistoric agricultural clearing features based on their formal type and informal construction. (Haun et al. 2004:69)

The mounds at Site 22381 were interpreted as agricultural clearing features based on their informal construction. The site is unaltered and in fair condition and was assessed as significant for its information content (Criterion "d"). The site was recommended for no further work by Haun et al. (2004:86).

## Site 50-10-74-22382

Site 22382 is a square enclosure located in the northeastern portion of the Haun et al. (2004) survey area. The site was initially identified by Ayres (1970:2) as B13-4. The site is described by Haun et al. (2004) as follows:

> The enclosure is 3.6 m long (northeast-southwest) and 3.4 m wide. There is no entrance (**Figure 47**). The walls are constructed of stacked subangular pahoehoe cobbles and small boulders. They vary in thickness from 0.6 to 0.71 m and in height from 0.6 to 0.87 m. No cultural remains were noted. (Haun et al. 2004:55)

Site 22382 was interpreted as a temporary habitation structure based on its small area (12.4 square meters). It is unaltered and in fair condition and was assessed as significant for its information content (Criterion "d"). The site was recommended for no further work by Haun et al. (2004:86).

## Site 50-10-74-22383

Site 22383 is a complex of 16 features located along the eastern boundary of the Haun et al. (2004) survey area. Portions of the site were initially identified by Ayres as Sites B13-2, -3, -26, -27, -29 through -33, -35 through -37 and -41 through -46. The site was subsequently documented by Haun et al. (2004) who identified eight enclosures (Features A, B, D, J, L, M, N and O), three walls (Features E, F and I), three mounds (Features C, H and K) and one terrace (Feature G). The Feature O enclosure was situated just outside the boundary of the Haun et al. (2004) survey area to the east. An additional enclosure, designated as Feature P was documented by Clark et al. (2013) in the seaward portion of the site. The extent of the site is presented in **Figure 48** and the features are described below:

> **Feature A**
>
> Feature A is a rectangular-shaped enclosure located just *mauka* of the eastern project area boundary on the exposed pahoehoe coastal escarpment. The enclosure was first recorded by Ayres as Site B13-3 (1970:5). The enclosure is 7.4 m in length (northwest-southeast) by 2.6 m in width. The walls of the structure vary in width from 0.59 to 0.72 m and in height from 0.65 to 0.9 m. The walls are constructed of stacked and weathered pahoehoe cobbles and small boulders. The

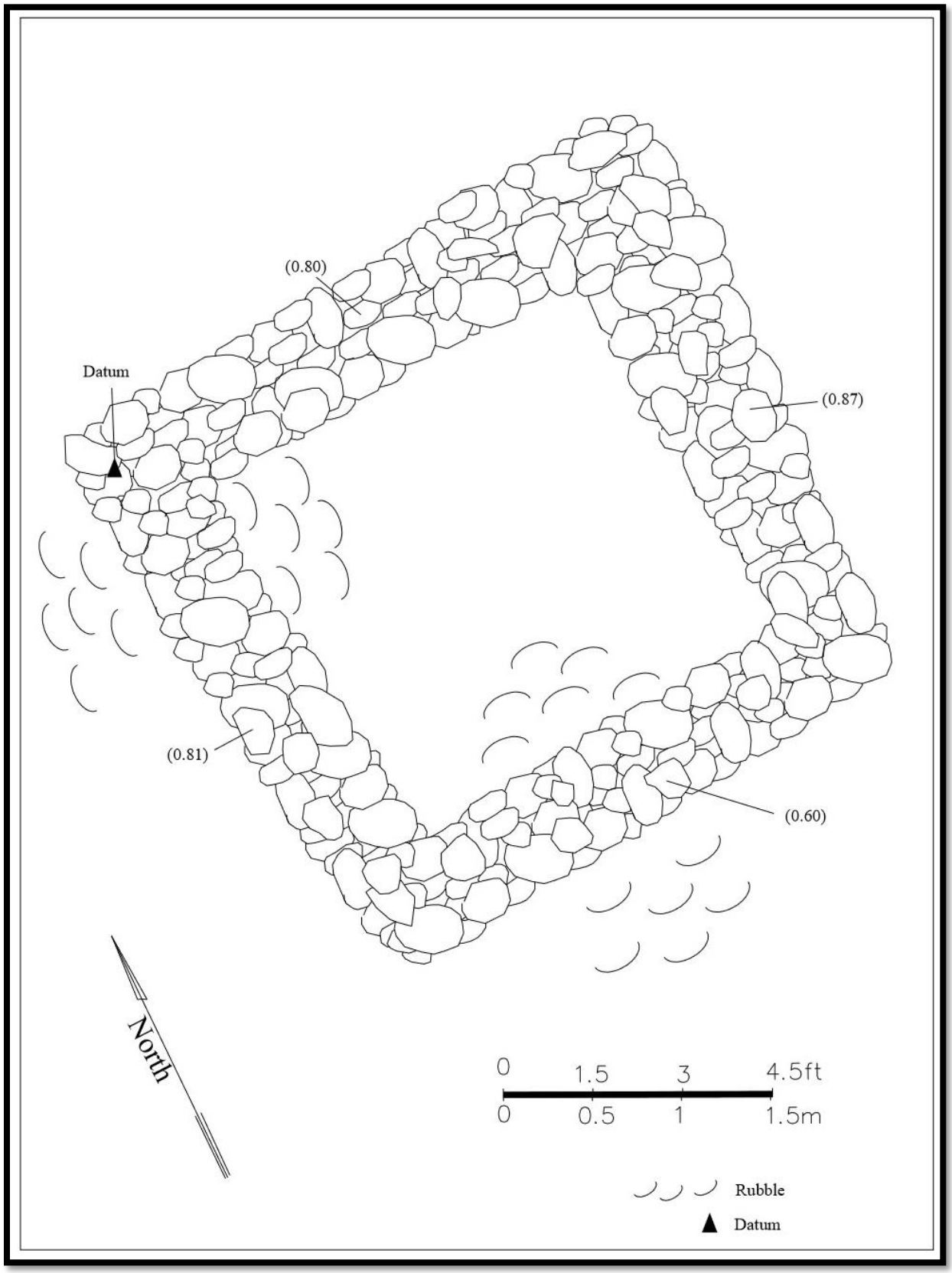


**Figure 47. Plan map of Site 22382 (from Haun et al. 2004:70).**

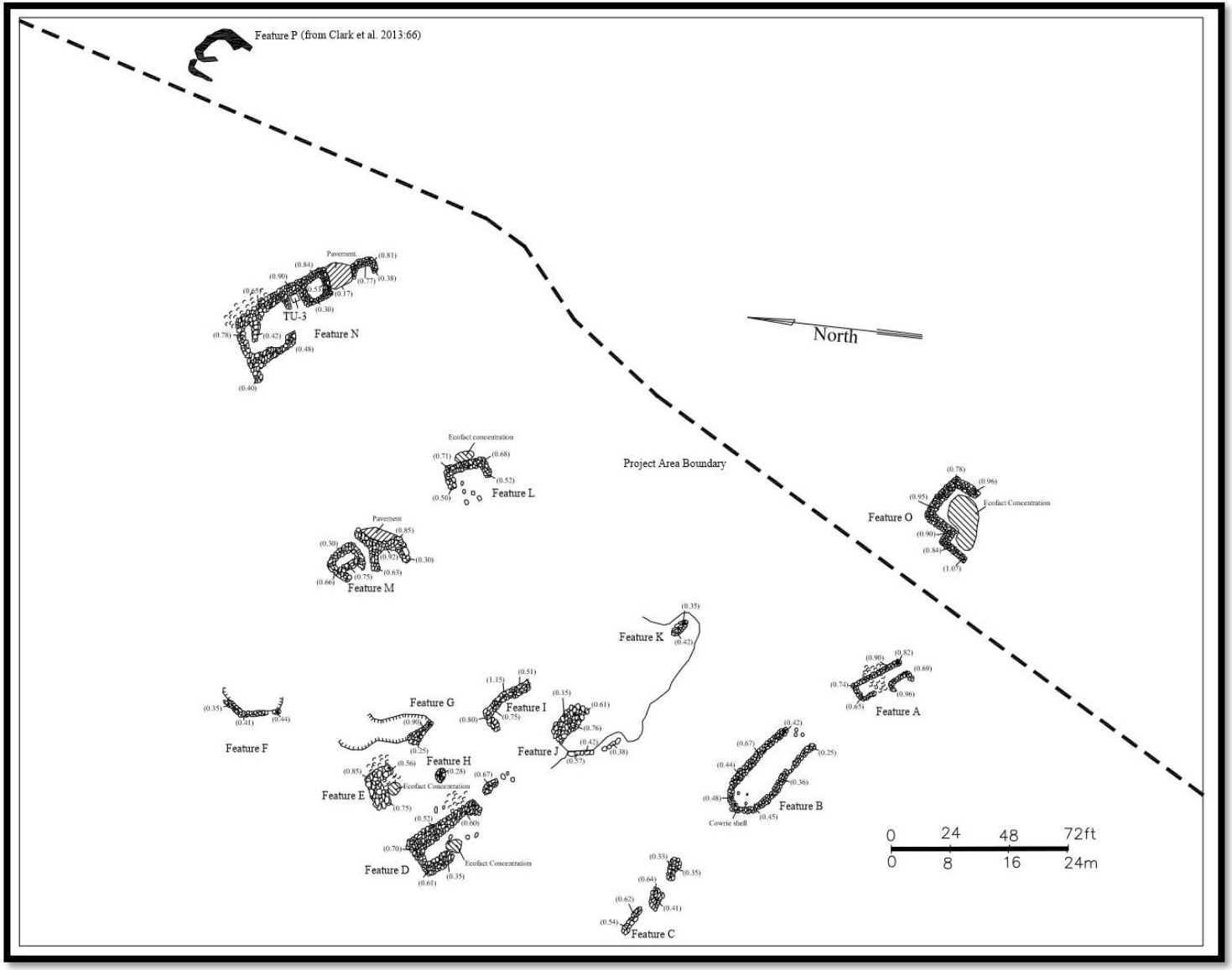


**Figure 48. Plan map of Site 22383 from Haun et al. (2004:71 with additions by Clark et al. 2013:49).**

structure is open at the southeast end (facing the ocean) with a second apparent opening in the center of the southwest wall.

A second, smaller enclosure extends off the southwestern wall of the main enclosure. It is 3.5 m in length (northwest-southeast) by 1.6 m wide. The walls are also built of stacked cobbles and boulders varying in height from 0.69 to 0.96 m. The feature is located on bare pahoehoe lava with small pockets of a brown silt loam soil less than 0.05 m in thickness within the enclosure. No cultural remains were observed. This feature is interpreted as a permanent habitation structure based on its area (84.6 sq m) and formal type.

**Feature B**

Feature B is a large, U-shaped enclosure located on a bare, coastal lava flow, 9.0 m northwest of Feature A. This feature was initially documented by Ayres as Site B13-41 (1970:4-5). The enclosure is open at the east-southeast end. It is 14.1 m long (northwest-southeast) and from 5.1 to 6.0 m wide (**Figure 49**). The walls of the enclosure are constructed of piled, weathered subangular pahoehoe cobbles and small boulders. These walls range in width from 0.45 to 1.2 m and in height from 0.25 to 0.67 m. The interior floor of the enclosure evidences a thin covering of a brown fine silt soil over the pahoehoe flow. A single sun bleached piece of cowrie shell was observed near the opening to the enclosure.

**Figure 49. Site 22383, Feature B enclosure (view to southeast; from Haun et al. 2004:72).**

The large size and shape of Feature B indicates that it may have functioned as a canoe shed. Ayres suggests that this site may have been a habitation structure, although no evidence of this was found during the current study. According to Ayres:

> This may have been a halau or canoe house as described by Ellis (1963, p.224), but it is not in an area where canoes could have been brought out of the water easily. Some of these structures (halau) were being used as dwellings during the time of Ellis' visit in 1823 and this may be the case here. (Ayres 1970:5)

**Feature C**

Feature C is an alignment of three oval mounds located c.11.0 m northwest of Feature B. The location of this site corresponds to Ayres' Site B13-42 (1970). The alignment is oriented in a northwest-southeast direction and is 12.7 m in length. The southeastern mound is 3.3 m long, 1.0 to 1.8 m wide, and from 0.33 to 0.35 m in height. The second mound is situated 1.8 m northwest of the first. It is 2.6 m long, 0.8 to 1.85 m wide, and 0.41 to 0.64 in height. The third mound is situated 1.0 m northwest of the second. This mound is 3.9 m long, 0.95 m wide, and 0.54 to 0.62 m in height.

The three mounds are each constructed of piled weathered pahoehoe cobbles and small boulders. No soil is present in this area and no cultural remains were observed. Feature C is interpreted as an ancillary feature associated with the permanent habitation based on its proximity to other permanent habitation structures.

**Feature D**

Feature D is a J-shaped enclosure located 25.0 m north of Feature C. The feature was first identified by Ayres (1970) as Site B13-33. The structure is 14.8 m long on the northeast side, 5.1 m long on the northwestern side, and 3.2 m long on the southwest side. The walls of the enclosure are constructed of stacked weathered pahoehoe cobbles and small boulders. The walls are 1.0 to 2.2 m wide and 0.35 to 0.7 m high. The wall is collapsed at the southeastern end, although most of the structure is fair condition and unaltered. A small amount of soil (<0.05 m) is present within the structure and a surface concentration of *cowrie, opihi* and *pipipi* shells is present at the southwestern corner. This concentration measures 2.0 m long (north-south) by 1.7 m wide. Feature D is assigned a permanent habitation function based on its formal type, area (75.48 sq m), and proximity to other permanent habitation features.

**Feature E**

Feature E is an L-shaped wall located 5.0 m northeast of Feature D. Ayres designated this feature as Site B13-32. The L-shaped wall measures 5.1 m (northeast-southwest) by 4.1 m (northwest-southeast). The feature is partially collapsed but intact sections indicate the walls were originally constructed of stacked subangular pahoehoe cobbles and small boulders. The walls are 1.7 to 2.5 m wide and 0.56 to 0.85 m high. No soil is present around the feature A surface concentration of weathered *cowrie* fragments and several waterworn basalt cobbles is located the eastern side of the wall. The concentration is 1.8 m long (northwest-southeast) by 1.61 m wide. Feature E is interpreted as a permanent habitation function based on its formal type, area (20.9 sq m), and proximity to other permanent habitation features.

**Feature F**

Feature F is a low, piled stone wall located on the edge of a natural depression in the pahoehoe lava flow c. 15.0 m north-northeast of Feature E. The location of this feature corresponds to Ayres Site B13-26. The wall is discontinuous and is slightly L-shaped. It measures 5.5 m long (north-south) and then angles slightly to the northeast at the northern end for an additional 2.7 m. The wall is

0.7 to 0.96 m wide and 0.35 to 0.44 m high. No cultural remains were found in association with the wall. Feature F is interpreted as an ancillary feature associated with the permanent habitation of this site based on its proximity to the other permanent habitation features in the area.

**Feature G**

Feature G is a terrace constructed against the side of a pahoehoe outcrop 4.3 m southeast of Feature E. The location of the feature appears to correspond to Ayres (1970) Site B13-43. The terrace is 4.3 m long (northwest-southeast) and 0.85 to 1.88 m wide. The northeastern side of the terrace has been built up a stacked stone retaining wall that averages 0.95 m in the height. The southwestern side abutting the outcrop is 0.25 m high. The surface of the terrace is unpaved and slopes slightly to the northeast. No cultural remains were observed. Feature G is interpreted as a special purpose structure based on its formal type and proximity to other permanent habitation features.

**Feature H**

Feature H is a low, oval-shaped mound located 4.5 m southwest of Feature G. This mound was identified Ayres as a possible ahu and assigned Site B13-31 (1970:7). It is 1.95 m long (east-west), 1.4 m wide, and 0.28 m in height. It is built of piled, weathered pahoehoe cobbles. No soil is present in this area and no cultural remains were observed. The proximity of this mound to other permanent habitation features suggests it likely functioned as an ancillary feature associated with the permanent habitation of this area.

**Feature I**

Feature I is an L-shaped enclosure located 8.5 m southeast of Feature H on a bare pahoehoe outcrop. This wall appears to correspond to Ayres (1970) Site B13-30 based on its location. The wall measures 7.6 m long (northwest-southeast) and extends to the southwest for 2.7 m. Portions of the wall are collapsed, but intact sections indicate it was originally built of stacked and weathered subangular pahoehoe cobbles and small boulders. The wall is 1.0 to 1.45 m wide and 0.51 to 1.15 m high. No cultural remains are present. Feature I is interpreted as a permanent habitation function based on its area (20.5 sq m), formal type, and proximity to other permanent habitation features.

**Feature J**

Feature J is an enclosure formed by the modification of a natural depression in the pahoehoe lava 5.5 m south-southwest of Feature I. Feature J corresponds to two sites identified by Ayres (1970) (Sites B13-35 and 36). A stacked stone wall forms the northern wall of the enclosure. It is 6.8 m long (northwest-southeast) and 0.61 to 0.76 m high. The wall retains a crude terrace located upslope to the north. The terrace is 2.6 m in width. The surface of the terrace is uneven and unpaved. It slopes down to the south. Several large *opihi* shells and a sun bleached *cowrie* shell are on the terrace.

The enclosure is open at the southeast end and enclosed on the northwest end by the side of the pahoehoe outcrop. There is an alignment of small pahoehoe boulders situated along the southwestern portion of the site. This alignment is 7.0 m long (north-south), 0.35 to 0.45 m wide, and 0.42 to 0.57 m high. The interior of the enclosure is comprised of a thin layer of brown silt loam (<0.05 m) covered in grass. No portable remains were observed within the enclosure. Feature J is interpreted as a permanent habitation structure based on its formal type and area (35.0 sq m).

**Feature K**

Feature K is a low mound on a bare pahoehoe outcrop 15.2 m southeast of Feature J and 19.5 m northeast of Feature B. The location of this feature corresponds to Ayres (1970) Site B13-37. The mound is oval in shape and is 2.55 m long (northwest/southeast), 1.1 m wide, and 0.35 m high. It is constructed of piled, weathered pahoehoe cobbles. No cultural remains or soil were found in association with the mound. Feature K is interpreted as an ancillary feature associated with the permanent habitation of the area based on its proximity to other permanent habitation structures.

**Feature L**

Feature L is a U-shaped enclosure located 28.5 m east of Feature I. The site was first identified by Ayres (1970) as B13-29. The enclosure is open to the west with overall dimensions of 5.9 m long (north-northwest to south-southeast) by 2.6 m wide. The walls are 0.88 to 1.05 m wide and 0.5 to 0.71 high. The walls are built of piled, weathered pahoehoe cobbles and small boulders. A thin layer of soil (<0.05 m) is present inside the enclosure. No portable remains were observed. A surface concentration of sun bleached *cowrie* shells, waterworn basalt cobbles and waterworn coral is present outside the enclosure adjacent to the eastern wall. This concentration is 2.7 m long (north-south) by 1.3 m wide. Feature L is assigned a permanent habitation function due to its size (15.4 sq m) and formal type.

**Feature M**

Feature M is an enclosure located 9.5 m northwest of Feature L. The feature was initially recorded by Ayres as Site B13-27 (1970). The feature consists of two adjacent enclosures and a low pavement. The first enclosure is located at the southern end of the feature. This enclosure is U-shaped and measures 5.1 m long (north-south) by 2.9 m wide. It is open along the western side. The walls are 0.85 to 1.0 m wide and 0.3 to 0.92 m high. A wall extends 3.1 m to the northeast from the northeast corner of the enclosure. This wall is 0.95 to 1.2 m wide and 0.8 high. It is built of stacked cobbles and small boulders. A crude pavement of small pahoehoe cobbles is present to the south of this wall and to the east of the enclosure. The pavement measures 3.1 m long (north-south) by 1.4 m wide.

The second enclosure is located 0.85 m north of the first enclosure. This enclosure measures 4.8 m long (north-south) by 3.8 m wide and has two compartments. The main compartment is located in the center of the feature. The interior of this compartment is 2.6 m long (north-south) by 1.0 m wide. The second compartment is located on the western side of the feature. It is U-shaped and is open on the western side. The interior of this compartment is 1.7 m long (north-south) by 1.1 m wide. The walls in this enclosure are constructed of stacked and weathered pahoehoe cobbles and small boulders. The walls are 0.8 to 1.05 m and 0.3 to 0.75 m high.

Exposed bedrock is present throughout the area with small, thin pockets of brown silt loam. Numerous sun bleached cowrie*, pipipi* and *opihi* shells were scattered around the feature. Feature M is interpreted as a permanent habitation structure based on its formal type, its size (37.4 sq m), and substantial construction (paved surface, multiple rooms).

**Feature N**

Feature N is a multi-roomed enclosure located on a bare pahoehoe outcrop c. 25.0 m east of Feature M. The feature was previously recorded by Ayres (1970) as three sites (Sites B13-44, 45 and 46). The feature is 26.1 m long (north-northwest to south-southeast) and 2.4 to 9.1 m wide.

The southern end of the feature consists of a small, C-shaped enclosure identified by Ayres as Site B13-46 (1970:3-4). This enclosure is 3.6 m long (north-northwest to south-southeast) by 2.4 m wide and is open to the west-southwest. The walls are constructed of stacked subangular pahoehoe cobbles and small boulders. The walls are 0.51 to 1.16 m wide and 0.38 to 0.81 m high. Several fragments of sun-bleached cowrie shell were noted within the enclosure.

A crude pavement of cobbles is located adjacent to the northern wall of the C-shaped enclosure. This pavement was identified as a low platform (Site B13-45) by Ayres (1970:6). This portion of Feature M is roughly square, measuring 3.3 m long (north-south) by 3.2 m wide. The surface of the pavement is uneven and slopes slightly to the east. It ranges in height from 0.17 to 0.25 m above ground surface. A single piece of waterworn coral was observed on the surface.

A multiple-roomed enclosure abuts the pavement on the northern side. This portion of Feature M was identified by Ayres as Site B13-44 (1970:2-3). The first room of the enclosure is located at the southern end adjacent to the pavement. It is rectangular in shape and is 4.4 m long (north-northwest to south-southeast) by 3.95 m wide. The walls of this room are 0.69 to 1.0 m wide and 0.3 to 0.84 m in height. The walls are built of stacked pahoehoe cobbles and boulders. No cultural remains were noted.

The second room abuts the first to the north-northwest. This room is open at the west-southwest end and is 3.9 m long (east-northeast to west-southwest) by 2.5 m wide. The walls are 0.8 to 1.56 m wide and 0.55 to 0.9 m high. A small area of soil and marine shell is present inside this portion of the feature. A 1.0 by 1.0 m test unit (TU-3) was excavated within it during the current study. A variety of cultural remains were collected from the surface of the unit. This surface collection yielded 60.10 grams of invertebrate remains (N=15, MNI=12). Taxa represented include *Cypraea tigris*, *Strombus sp*., *Patella sandwichensis* and *P. talcosa*, *Tellina sp*., and *Nerita picea*.

The excavation of TU-3 revealed a single deposit of a very dark grayish brown silt loam, overlying bedrock. This deposit ranged in thickness from 0.09 to 0.14 m. Many of the same invertebrate species collected from the surface were present in Layer I, with a total of 723.55 grams (N=2002,MNI=1418). The most abundant species were the Neritids at 297.00 grams (N=959, MNI=903). Ranked second by weight but not by abundance were the cowrie shells (Cypraeidae). In addition to the previously discussed taxa, Isognomonidae *Isognomon perna* were identified (N=360, MNI=162, 69.35 grams).

Faunal remains were also collected from Layer I. A total of seven elements of mammal bone were collected, all charred. One diagnostic fish bone representing Scaridae, or parrotfish was identified along with Scaridae fish scales.

A complete polished adze manufactured from fine-grained basalt was recovered from Layer I at 0.01 m below surface. It is 45.60 mm long, 18.30 mm wide and 9.00 mm thick. The bevel measures 19.00 mm and the bevel angle is 45 degrees.

Flaked lithics collected from Layer I included two volcanic glass cores and eight flakes. Multiple flakes had been removed from both cores and the flakes were unifacially flaked. The volcanic glass is relatively poor grade surface chill material. A piece of coral and a piece of cut and burnt mammal bone were also recovered. The mammal bone exhibited one cut edge approximately 9 mm long. Waterworn pebbles or *'ili 'ili* were also collected from Layer I.

Charcoal was recovered from the Layer I deposit during the excavation of TU-3. A sample of this charcoal was submitted for radiometric age determination and yielded three potential age ranges; AD 1450-1675, 1775-1800, and 1940-1945.

The third room of the enclosure is situated at the north-northwestern end of the feature. It is rectangular in shape and is 8.2 m long (north-northwest to south-southeast) by 7.6 m wide. The walls are constructed of stacked cobbles and small boulders. The walls of this room are 1.0 to 1.85 m wide and 0.4 to 0.78 m high. The northern corner of the room has collapsed outward. The interior floor is comprised of bare lava with several *pipipi* and *cowrie* shells present. A piled stone wall is situated inside the room at the northern end. It is 2.5 m long (east-west), 0.55 m wide, and 0.42 m high. The wall served to further divide this room. Feature N is interpreted as a permanent habitation structure based on its formal type, its area (185.5 sq m) and substantial construction (paved surface, multiple rooms).

**Feature O**

Feature O is a well-built enclosure located c.16.0 m southeast of Feature A outside of the project area boundary. This enclosure was initially documented by Ayres (1970) as Site B13-2. The enclosure is constructed on a bare pahoehoe outcrop and is open at the southern end. It is roughly U-shaped with a jog along the western side. The feature is 9.2 m long (northwest-southeast) by 8.7 m wide. The walls are built of stacked subangular pahoehoe cobbles and small boulders. The walls are 0.9 to 1.3 m wide and 0.78 to 1.07 m high. A thin deposit of brown sandy silt with scattered marine shell is present on the interior surface of the enclosure. Feature O is interpreted as a permanent habitation structure based on its formal type, area (80.0 sq m), and proximity to other permanent habitation features. (Haun et al. 2004:6-77).

**Feature P**

Feature P consists of a three-sided enclosure that is constructed on an exposed pahoehoe bedrock ground surface (**Figure 50**) thirty-two meters northeast of Feature N. The enclosure, which opens to the southwest, measures 6.2 meters long (north/south) by 4.0 meters wide ( east/west). It is constructed of loosely stacked/collapsed medium to large pahoehoe cobbles and a few small boulders. The walls range from 60 to 75 centimeters wide, and intact sections along the interior edges stand three to four courses (up to 75 centimeters) tall. The exterior edges are mostly collapsed with sloped sides that stand up to 1.1 meters tall. There is a 75 centimeter break in the wall along the northern edge of the enclosure (near the northwest corner) where no cobbles are present. The enclosed interior space consists of somewhat level bedrock with scattered cobbles, grasses, and a Christmas-berry tree also present. Cultural debris observed at Feature P included a few small waterworn pebbles ( 'ili 'ili), a medium waterworn cobble that appeared fire cracked, a single Cellana shell fragment, and a pull top beer can. (Clark et al. 2013:50)

Site 22383 was interpreted as a permanent habitation complex based on the size and method of construction of the various features. The site is altered and in fair condition. It was assessed as significant as an excellent site type example (Criterion “c”) and for its information content (Criterion “d”), and was recommended for preservation by Haun et al. (2004:86).

**Figure 50. Site 22383, Feature P enclosure (from Clark et al. 2013:50)**

## Site 50-10-74-24404

Site 24404 is the location of a former Japanese Cemetery situated in the northeastern portion of the Clark and Rechtman (2019) survey area (see **Figure 4**). The plan map of the site is presented in **Figure 51** with an overview of the central cemetery monument presented in **Figure 52.** The site was first documented by Guerriero et al. (2006b) and subsequently recorded by Clark and Rechtman (2019). It is described by Guerriero et al. (2006b) and Clark and Rechtman (2019) as follows:

> Site 24404 is comprised of the remnants of a former Japanese Cemetery marked by a central monument whose inscription states that it was erected in July of 1939 by the Honu'apo Japanese Club, spearheaded by Mr. Sanji Abe of Hilo. The Hutchinson Sugar Plantation Company deeded the cemetery to the Honu'apo Japanese Club in 1950. In 1977, all the remains of persons interred at the cemetery had been removed and placed elsewhere by the Honu'apo Japanese Club [see Guerriero et al. 2006b:Appendix A]. The names of the deceased and the place of re-interment are unknown. This parcel of land was deeded back to the Ka'u Sugar Company March 5th 1974. The cemetery is situated on a hillside that is bound on the north and south by steep intermittent water channels and a private road known as the sugarcane haul road 37 on the west (mauka) side, though it does not appear to extend that far up.
>
> The central monument with Japanese/Kanji inscriptions on 3 sides is the only obvious remaining marker. The base is three-tiered concrete and measures approximately 1m by 1m at the lowest tier. The upper portion is approximately l.3m tall and made of cut granite stone. It is not known how many burials were

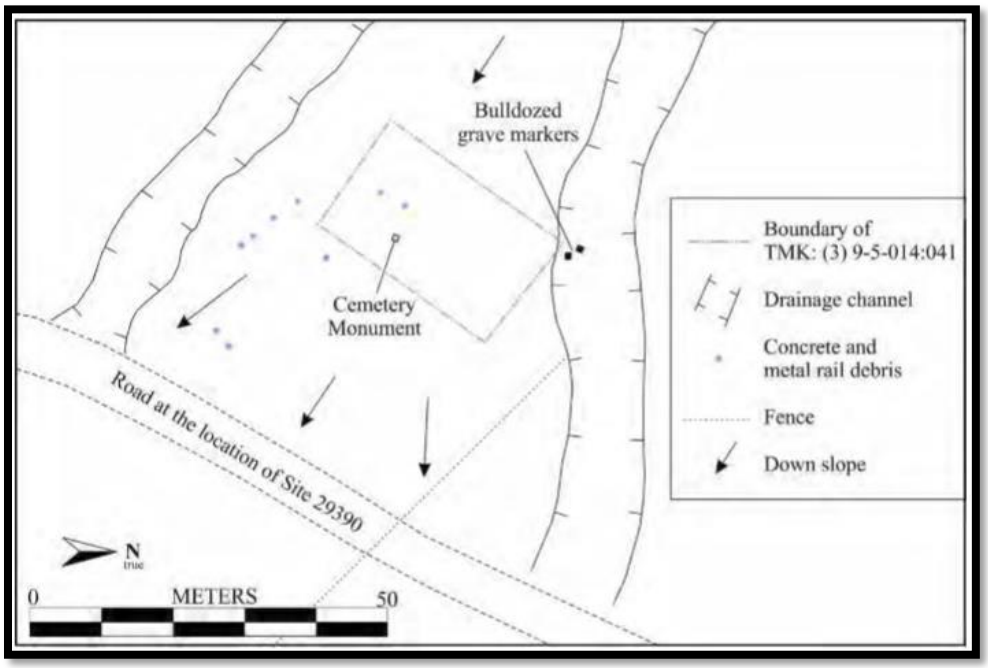


**Figure 51. Plan map of Site 24404 (from Clark and Rechtman 2019:224).**

**Figure 52. Site 24404 central cemetery monument (from Clark and Rechtman 2019:225).**

> present in this area or how far makai or mauka it extended. There are four broken cement blocks scattered around the central monument that probably served as grave markers or outlined graves when intact. Also present in the general vicinity of the central monument are soil depressions that appear to indicate the locations of previous grave sites. In the northern ravine there is a cement capstone and broken headstone that appeared to have been washed down during heavy rains or moved mechanically during disinterment. (Guerriero et al. 2006b:41)

The 0.117-acre parcel, on which the cemetery was formerly located, is situated on a fairly steep, southeast facing, soil slope, at an elevation of roughly 100 feet above sea level, between a road marking the former Honu'apo-Hīlea railroad alignment (Site 29390) and the paved cane haul road that provides access to the study area. Intermittent drainage channels bound the parcel to the northeast and southwest. Guinea grass covers the surface of the former cemetery, while koa haole and kiawe are growing within the drainages. The concrete and granite monument is located in the central section of the former cemetery parcel. The monument consists of a four-tiered concrete slab with a granite, Katakana and Kanji inscribed, memorial on top. The inscription states that the monument was erected by the Honu'apo Japanese Club, spearheaded by Mr. Sanji Abe of Hilo in 1939 (Guerriero et al. 2006a:41). The measurement recorded for the monument during the current study differ slightly from those that were previously recorded. The upper, granite-cut portion of the memorial measures 1.17 meters tall, 0.3 meters wide, and 0.2 meters thick. The concrete foundation at the base of the memorial measures 2.38 meters long by 0.8 meters wide, with a height of 0.2 meters tall. The three remaining tiers of the concrete base

In the drainage channel 30 meters to the north of the monument are the remains of two concrete grave markers that appear to have been pushed to their present location by a bulldozer. It is not clear if this occurred as part of the re-interment process in 1977, or a part of later plantation/ ranch land clearing activities. One of the concrete grave markers, measuring 0.9 meters by 0.9 meters by 0.3 meters thick, still has a broken granite headstone attached to it. The other measures 1.7 meters long by 1.3 meters wide by 0.6 meters thick. Both former markers are formed of concrete reinforced with small-gauge rail. Elsewhere on the grass slope surrounding the cemetery monument, within a roughly 65-meter by 45-meter area that is larger than the boundaries of the 0.117-acre parcel, are several lengths of rusted small-gauge rail and broken pieces of concrete that may or may not have been part of other former grave markers. The soil depressions noted by Guerriero et al. (2006b:41) that appear to indicate the locations of previous grave sites are also present within this area. Mr. Keoni Fox, a recognized cultural descendant of the study ahupua'a, related (during consultation conducted as part of the current study) that his elder kūpuna recalled that not all of the graves at Site 24404 were relocated during the 1977 re-interment, and that buried human remains could still be present within the cemetery parcel. (Clark and Rechtman (2019:223-224)

As stated, Site 24404 was interpreted as the former location of an historic Japanese cemetery by Clark and Rechtman (2019). The site was assessed as significant for its information content (Criterion "d"), and for its cultural value (Criterion "e) by Clark and Rechtman (2019:413). The site was recommended for preservation.

## Site 50-10-74-24409

Site 24409 is a complex of four boundary and agricultural features situated in the southeastern portion of the Clark and Rechtman (2019) survey area (see **Figure 4**). The site was first documented by Guerriero et al. (2006b) and subsequently recorded by Clark and Rechtman (2019). A plan map of the site is presented in **Figure 53** with selected feature photographs presented in **Figure 54** and **Figure 55**. It is described by Guerriero et al. (2006b) and Clark and Rechtman (2019) as follows:

> Site 24409 was originally recorded as a complex of consisting of 13 features (Features A-M), described as:
>
> > …comprised of agricultural terraces built along the base of a steep cliff adjacent to an intermittent watercourse. Site 24409 is located in the southeastern portion of the study parcel and approximately 180m west of Highway 11 and just mauka of Site 24412. Site 24409 may be associated with the LCA's delineated by the walls of Site 24412. Features A-H were likely constructed to utilize the intermittent water flow from a seasonal gulch located adjacent on the south. (Guerriero et al. 2006b:58)
>
> Site 24409 was relocated during the current fieldwork, but the lack of an overall site map in the Guerriero et al. (2006b) report, the brief feature descriptions presented in that report, the inclusion of natural features as part of the overall site, and the incomplete recordation of some of the features within the site, made specific reassignment of each of the previously assigned feature designations difficult. For the reasons stated above, the description of Site 24409 has been updated here to reflect the current site conditions, and the previously assigned features have been collapsed into four currently designated features (Features A-D) that include all of the previously recorded features, plus additional wall sections that were newly recorded as part of the current study. The previously assigned Feature A and B designations were retained for the walls they represent; the previously assigned Feature C-H designations are now described as part of Feature C (a soil-filled terrace); and the previously assigned Feature I-M designations are now described as part of Feature D (a discontinuous wall).
>
> For the purposes of the current study, Site 24409 is described as a complex, consisting of three walls (Features A, C, and D) and a soil-filled terrace (Feature C), that has the maximum overall dimensions of 860 meters long by 100 meters wide. The site is situated in the east-central portion of the study area within Kīʻolokū and Honuʻapo ahupuaʻa (on TMKs: (3) 9-5-012:017 and (3) 9-5-014:017). Vegetation within the site complex consists primarily of Guinea grass and koa haole, with some Christmas-berry and scattered kiawe trees also present. The walls follow the base of a steep slope that marks the transition from Rough Broken Land (RB) mauka, to Na'alehu Silty Clay Loam (NaC) makai (Sato et al. 1973). Most of the wall sections are terraced into the hillside along their mauka edges. They range from completely collapsed piles of cobbles, to neatly stacked edges, to core-filled constructions. As suggested by Guerriero et al. (2006b), the walls at Site 24409 (Features A, B, and D) may have served a boundary function related to the nearby Site 24412 walls, and Feature C, located along the edge of an intermittent drainage between Features B and D, may have been used for agricultural purposes. Portions of the Feature B and D walls are depicted on an 1887 map of a portion of Kaʻū prepared by M.D. Monsarrat in 1887 (Hawaiʻi Registered Map No. 1455), indicating that those portions at least were constructed prior to that date. The other portions of the walls, given their formal attributes, appear contemporaneous.

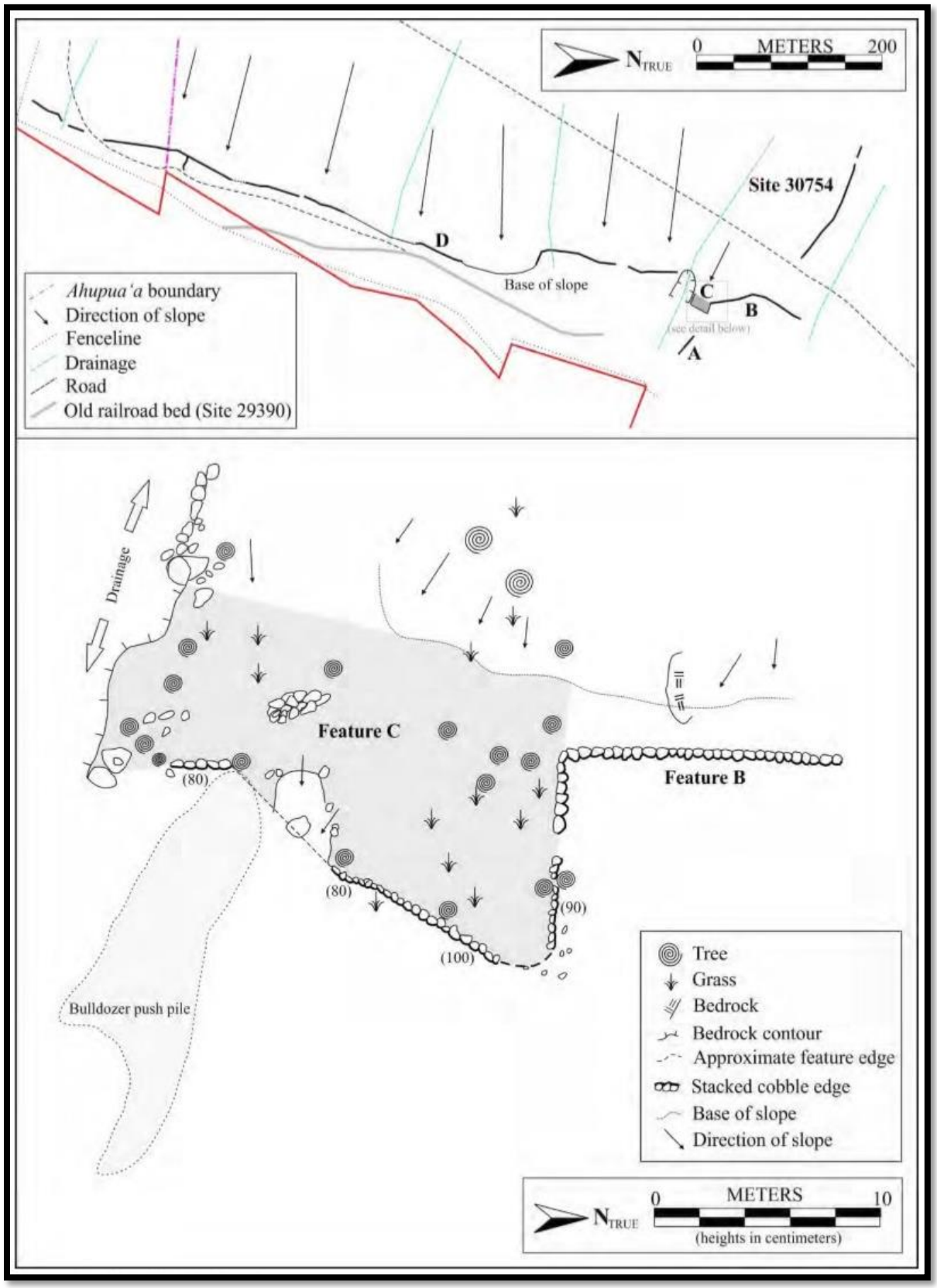


**Figure 53. Site 24409 plan map (from Clark and Rechtman 2019:267).**

**Figure 54. Site 24409, Feature A wall (view to south; from Clark and Rechtman 2019:268).**

**Figure 55. Site 24409, Feature B wall (view to south; from Clark and Rechtman 2019:269).**

Given the proximity of these walls to known Historic property boundaries, it is likely that they were associated with the use of several kuleana parcels situated partially within the study area (i.e. LCAw. 9654 to Nana, LCAw. 1668 to Kana, and LCAw. 10323 to Pae), and perhaps also with later ranching and plantation endeavors on the property. Updated feature descriptions for Site 24409 are presented below that contain more specific functional interpretations for each of the recorded features.

**Feature A**

Feature A consists of a short, mauka/makai wall remnant situated in the northeastern portion of Site 24409, 10 meters to the southeast of Feature C. This feature was previously described as follows:

> Site 24409 Feature A is a rock wall, constructed of angular small boulders and large cobbles measuring 30m in length, 1m wide and 1.2m in height and orientated east/west. Feature A is situated on a level surface area approximately 42m east of the cliff base and 22m east of Feature B. It appears to have continued in an easterly direction but was truncated by previous disturbance as evidenced by tumbled stones. Feature A is interpreted to be associated with the agricultural terraces located to the west. (Guerriero et al. 2006b:62)

Feature A still appears much as described in 2006. It consists of a bulldozed alignment of boulders and cobbles that measures roughly 30 meters in length. Most of this alignment is unrecognizable as a wall, but a roughly 4-meter long section near the center of the feature retains some remnant stacking that stands 0.5 meters tall by 1 meter wide. Both ends of Feature A currently fade in the bulldozed landscape surrounding the feature, but given its orientation, this wall may have formerly connected at its northwestern end to the southern corner of Feature C (10 meters to the northwest), and to the southeast a more intact section of core-filled wall (Feature D of Site 24412 located 53 meters to the southeast). The former alignment of the Hutchinson Plantation Railroad (Site 29390) separates these two wall sections, but the makai wall (Site 24412 Feature D) once formed a portion of the northern boundary of LCAw. 9668 to Nana; Feature C may have also once served as a boundary wall, perhaps for Nana's property, or a neighboring property, prior to the construction of the Hutchinson Plantation Railroad during the late nineteenth century.

**Feature B**

Feature B consists of a wall that extends along the base of the slope to the north of Feature C . This wall was previously recorded as follows:

> Site 24409 Feature B is an agricultural terrace situated near the base of a steep cliff and adjacent to an intermittent gulch on the south. The stone construction of Feature B measures approximately 60m in length by approximately 2m wide and 1.3m high. Fairly level soil with some scattered stones continues for approximately 12m to the west. Feature B is constructed of small angular basalt boulders and large cobbles, 4 to 5 courses high and built contoured to the topography utilizing exposed outcrops. (Guerriero et al. 2006b:62)

As recorded during the current study, Feature B consists of a wall that extends north from Feature C, along the base of a steep slope, for a total distance of 105 meters. The wall is constructed of stacked medium to large pāhoehoe cobbles, but it has collapsed at several locations. Intact

sections of the wall stand 1 to 1.5 meters tall, by roughly 0.9 meters wide. The wall retains the slope along its mauka edge, creating a roughly 1 meter wide terrace of level soil against the bedrock slope. Feature C currently terminates to the north at an intermittent drainage channel, but a wall on an 1887 map of a portion of Ka‘ū prepared by M.D. Monsarrat in 1887 (Hawai‘i Registered Map No. 1455), at the approximate location of Feature C, is shown extending 160 meters further north to Site 30747 (a mauka/makai core-filled wall). The relatively level terrain makai of Feature B consists of grubbed pasture that contains a fairly deep deposit of soil (as indicated in the banks of the eroded drainage channels that bound the wall to the north and south). While the terraced upslope edge of Feature C could have been used for limited agricultural purposes as suggested by (Guerriero et al. 2006b), the area makai seems more likely to have been extensively planted in the past. Feature C, given its location, likely served a boundary function perhaps associated with the agricultural use of kuleana parcels awarded in its vicinity.

**Feature C**

Feature C consists of a terrace comprised of 6 of the features (Features C-H) previously recorded by Guerriero et al. (2006b) at Site 24409. These features, described as (“C”) a C-shape incorporated into the southern terminus of Feature B; (“D”) an agricultural terrace situated at the base of a steep cliff; (“E”) an agricultural terrace situated atop an outcrop; (“F”) a rock alignment situated atop a slope; (“G”) a dry-laid stone dam situated across an intermittent gulch; and (“H”) a water diversion channel. Collectively, these features actually describe a single soil-filled terrace along the northern edge of an intermittent drainage channel at the southern end of the Feature B wall. The descriptions and plan view provided by Guerriero et al. (2006b:61-63) for these features were checked against the existing conditions in the field during the current study, and found to be quite inaccurate.

Feature C consists of a soil-filled terrace situated between the southern end of Feature B and the northern edge of a natural drainage channel at Site 24409. The terrace is oriented lengthwise northeast/southwest, and it measures 20 meters long by 12 meters wide overall. The terrace is formed along its northeastern edges by an L-shaped wall, constructed along the base of the steep slope, that joins with, and is constructed in a similar manner to, Feature B. The L-shaped wall, exhibits a few sections of collapse, but consists primarily of neatly stacked cobbles standing 0.8 to 1 meter tall along the exterior edges. The interior of the terrace retains a level surface of soil against the steep slope to the southwest, with cobbles and boulders scattered across it, and Guinea grass and koa haole growing out of it. The southwestern edge of the terrace consists of naturally deposited boulders along the edge of the drainage. These boulders continue along the drainage edge in a roughly linear pile below the terrace as well, where they may have been pushed by a bulldozer at some point in the past to help control run-off. The drainage itself is steep and fairly deeply eroded. While Feature C may have been used for agricultural purposes in the past, and the terrace may have received flood waters from the drainage during times of heavy rain, the dam (G) and water channel (H) previously mapped and described by Guerriero et al. (2006b:61-63), are completely natural features with no evidence of former modification. As for the other features previously assigned to this terrace: “C” describes a collapsed section of the makai wall; “D” describes natural bedrock at the mauka extent of the level soil; and “E” and “F” each describe portions of the natural drainage edge adjacent to the level surface of the terrace itself.

**Feature D**

> Feature D consists of a discontinuous wall that extends southwest from the drainage channel adjacent to Feature C for 735 meters. This wall follows the 250-foot elevation contour across the steep slope that bounds the mauka edge of Site 24409 and incorporates 5 of the features (Features I-M) previously described by Guerriero et al. (2006b), including ("I") a large rock mound interpreted as a clearing pile, ("J") a roughly stacked rock mound interpreted as a clearing pile, ("K") a loosely stacked rock mound, ("L") a rock alignment interpreted as a traditional agricultural feature, and ("M") a stone alignment interpreted as a traditional agricultural feature. These previously recorded features comprise the northernmost section of the Feature D wall. They occur in a line, roughly 135 meters long that extends across the slope to the southwest of Feature C, and are all connected to one another by additional sections of wall that were not previously identified. The mound features represent collapsed sections of the wall that have tumbled down slope, and the alignment features represent more intact wall sections. The Feature D wall continues to the southwest beyond the previously recorded features, following the 250-foot elevation contour, for an additional 600 meters. The terrain in the vicinity of the wall is steep to moderately sloped, and is covered in Guinea grass, koa haole, and Christmas-berry for its entire length. Owing to the steep terrain and disturbance caused by bulldozing, the wall is in poor condition. It generally stands 0.7 to 1.5 meters tall along its makai edge, and is terraced into the hillside along its mauka edge. In some areas, the terrace along upslope side of the wall is wide enough to have been used as a road in the past, but due to the poor condition of the wall, and the number of collapsed sections, it difficult to tell if the entire feature may have once retained the edge of a possible roadway. With the exception of the wall section nearest to Feature C, most of the Feature D wall is depicted on an 1887 map of a portion of Kaʻū prepared by M.D. Monsarrat in 1887 (Hawaiʻi Registered Map No. 1455), indicating that it was built prior to that date. The wall likely served a boundary function associated with use of lands along the makai edge of the study area. (Clark and Rechtman 2019:265-272)

As stated, Site 24409 was interpreted as a complex of boundary and agricultural features by Clark and Rechtman (2019). The site was assessed as significant for its information content (Criterion "d") and was recommended for preservation (2019:413).

## Site 50-10-74-24410

Site 24410 is a cattle enclosure located in the northeastern portion of the Clark and Rechtman (2019) survey area (see **Figure 4**). The site was first documented by Guerriero et al. (2006b) as a complex of two walls incorporated into a modern corral (Feature A), a wall (Feature B), a portion of the of the old Hutchinson Plantation Company railroad (Feature C), and an agricultural modified outcrop(Feature D). As no map was included in the Guerriero et al. (2006b) report, with only limited descriptive information available, Clark and Rechtman (2019) redesignated the features as components of multiple sites. The Site 24110 designation was maintained for the Feature A walls, the Feature B wall was designated as Site 50-10-74-30738 (discussed below), the Feature C railroad grade was referenced with the existing site designation of 50-10-74-29390 (discussed below), and the Feature D modified outcrop was included a nearby agricultural site (50-10-74-24411; outside current area of study). A plan map of the site is presented in **Figure 56** with a photograph of the enclosure presented in **Figure 57**. The Site 24410 enclosure is described by Clark and Rechtman as follows:

> Site 24410 (Feature A) consists of a mauka/makai wall and two perpendicular walls that form part of a Historic/Modern cattle corral and loading ramp adjacent to the eastern boundary of the study

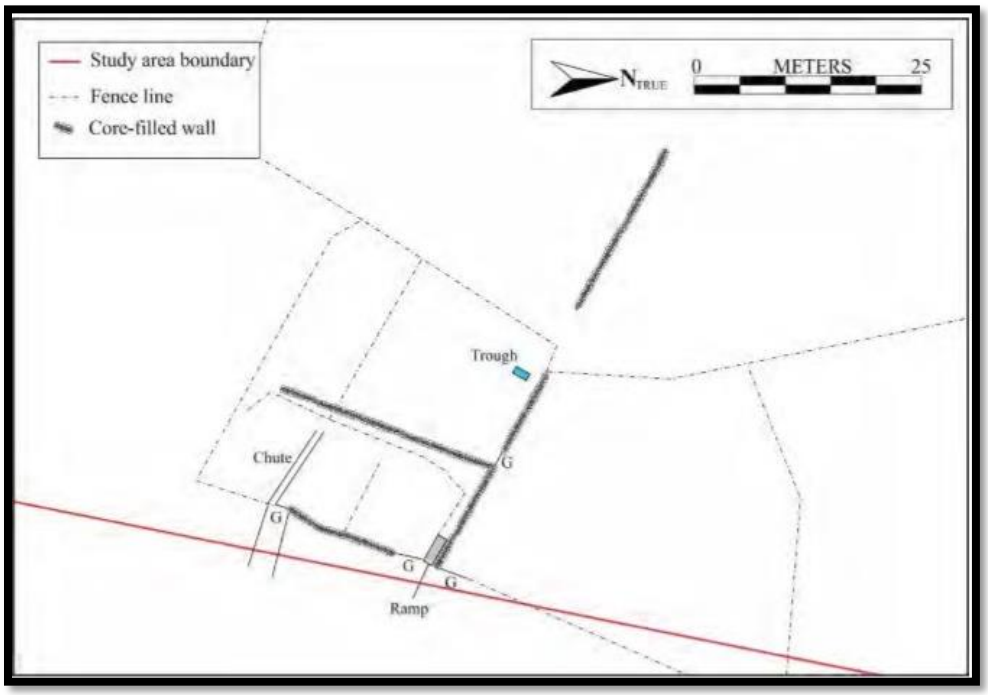


**Figure 56. Site 24410 plan map (from Clark and Rechtman 2019:274).**

**Figure 57. Site 24410 enclosure wall (from view to southwest; from Clark and Rechtman 2019:276).**

> property. The corral measures 50 meters long by 30 meters wide overall, and contains a concrete water trough of a type typically built by Ka'alu'alu Ranch, the ranching subsidiary of the Hutchinson Plantation Company, during the 1950s (Clark et al. 2013). All of the walls are core-filled, measuring 0.7 to 1 meter wide and standing 1 to 1.5 meters tall. The main mauka/makai wall begins 52 meters mauka (northwest) of the corral, and extends southeast for 47 meters to a point where it is absent for a distance of 27 meters. It then continues southeast for an additional 15 meters, along the northeastern edge of the corral, before terminating at the eastern property boundary. The two perpendicular walls extend southwest from either end of the last section of the mauka/makai wall for 20 meters each, spaced roughly 15 meters apart from one another. They form internal divisions within the corral. All of these walls were likely constructed during early to mid-twentieth century, and updated throughout the years. The remainder of the corral is formed of more recently erected metal guard rails, barbed-wire, hog wire, iron fence, and wood. A narrow cattle chute within the corral appears to be used for administering medicine and branding cattle, while a ramp that ascends to the east from the eastern end of the mauka/makai wall is used for loading/unloading cattle. The corral is still used for ranching purposes, and the concrete water trough continues to provide a source of water for cattle grazing in the area. (Clark and Rechtman 2019:2019:274)

Site 24410 was assessed as significant for its information content (Criterion "d") by Clark and Rechtman (2019:413). It was recommended for no further work.

## Site 50-10-74-24412

Site 24412 is a complex of six stone walls near the eastern boundary of the Clark and Rechtman (2019) survey area (see **Figure 4**). The site was first documented by Guerriero et al. (2006b) as a complex of four walls (Features A-D); however, during the subsequent Clark and Rechtman (2019) study, two additional walls were identified (Features E and F). The site encompasses an overall maximum area of 50 meters by 125 meters (Figure 320). A plan map of the site is presented in **Figure 58** with a photograph of the enclosure presented in **Figure 59**. As indicated in the map, Features A, B and C are situated outside the boundaries of the Clark and Rechtman (2019) survey area. The Site 24412 complex is described by Clark and Rechtman (2019) as follows:

> **Feature A**
>
> Feature A is a north/south running core-filled wall that parallels, and is adjacent to, Highway 11 at the northeastern end of Site 24412. The makai ends of Features B and C abut the mauka edge of Feature A. Feature A was previously described as: … a bi-faced core filled boundary wall that defines the eastern property boundary of the study parcel and runs parallel with the Hawaii Belt Road on the east. It measures approximately 670m long, commencing at the gate entrance to cane haul road 37 on the north and following Highway 11 south terminating at the sharp curve near Pohina Pali. Feature A has one break along its length where a residential driveway entrance is located. Feature A is 5 to 6 courses high, 1m tall and 0.6m wide, constructed of sub-angular a'a basalt cobbles and small boulders. The eastern terminus of Feature B intersects with Feature A near the middle. At this intersection scattered historic glass was exposed on the eastern perimeter of Feature A. (Guerriero et al. 2006b:65) Feature A is situated within LCAw. 9564 to Kana (on TMK: (3) 9-5-014:035), and is not included within the current study area. This wall was briefly inspected during the most recent fieldwork and photographed. The wall does not follow the edge of Highway 11 for 670 meters as stated by Guerriero et al. (2006b:65), but rather it follows the mauka edge of the highway alignment for a total distance of 120 meters, extending southwest from near the

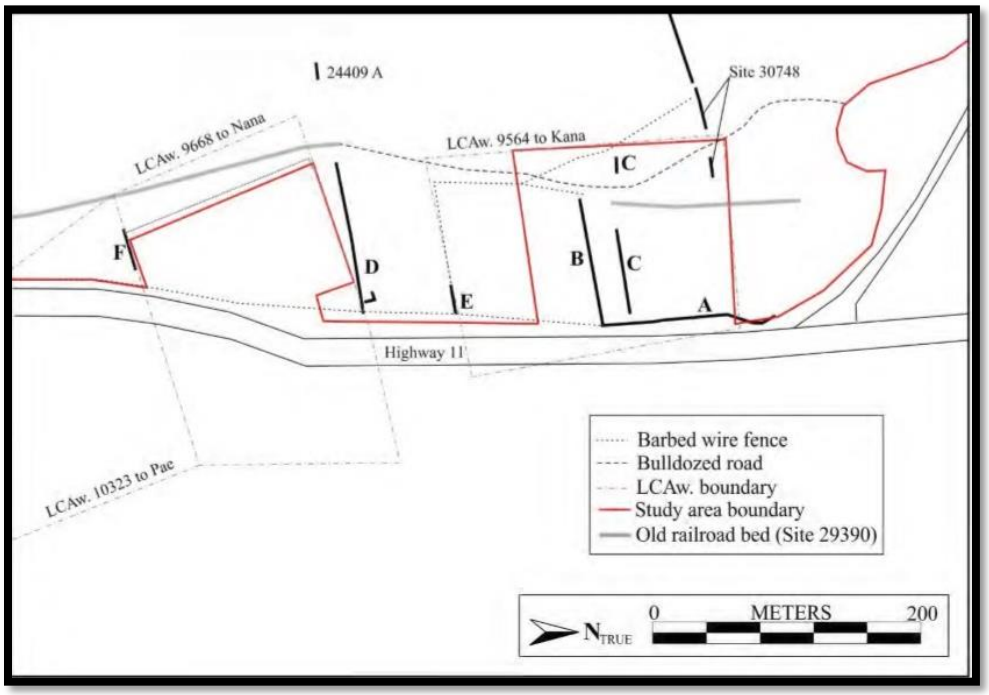


**Figure 58. Site 24412 plan map (from Clark and Rechtman 2019:283).**

**Figure 59. Site 24412, Feature A wall (view to northeast; from Clark and Rechtman 2019:284).**

makai end of the paved cane haul access road to the property into the former kuleana parcel. The wall has retained most of its stacking, but its northern and southern terminations end in collapse, and a barbed wire fence runs parallel to its mauka edge. Aside from the glass bottles observed at its intersection with Feature B, no other cultural materials were observed on or adjacent Feature A.

**Feature B**

Feature B is a core-filled wall that abuts Feature A at its southeastern termination. This wall was previously described as: …a LCA boundary wall that defines the LCA 9564 portion 11 on the south and portion 35 on the north. Feature B measures approximately 122m northeast/southwest, is approximately l.2m tall and 0.6m wide and is constructed of a'a sub-angular basalt cobbles. Feature B connects to Feature A on the east, broken historic bottles were identified atop Feature B wall and scattered nearby. Scattered broken bottles indicated a recent episode of bottle hunting in a historic trash pit. (Guerriero et al. 2006b:66) Feature B is situated within LCAw. 9564 to Kana (on TMK: (3) 9-5-014:035), and is not included within the current study area. This wall was briefly inspected during the most recent fieldwork and photographed. The wall is mostly intact and constructed of neatly stacked small to large-sized cobbles. It averages approximately 0.8 meters wide, 0.7 to 0.9 meters tall, and extends northwest from the southwestern end of Feature A for 96 meters before terminating near the makai boundary of the study area at bulldozing and a barbed wire fence, near the former location of the Site 29390 railroad bed. Present on the wall, where Feature B abuts Feature A, are several clear, aqua and brown-colored glass bottles and a few broken ceramic fragments that appear to have come from a type of jar. Several of the glass bottles have various words imprinted on them such as "Japan" or "Fuji Masamune F.S.B Co" which indicate that some of these bottles are Sake bottles. These bottles post-date 1891, when the McKinley Tariff took place and the products exported from Japan went from the label "Nippon" to "Japan." It appears that several additional bottles were also collected from Feature B of Site 24412 by Guerriero et al. (2006b). Additionally, a piece of iron roofing was noted near the mauka end of the wall.

**Feature C**

Feature C consists of a core-filled wall that parallels Feature B, roughly 20 meters northeast. This wall was previously described as: … a low lying remnant wall section that is located within LCA 9564 and is orientated makai/mauka. Feature C measures approximately 20m in length, 1m wide and at its highest point is 0.6m. It is constructed of medium sub-angular boulders, the foundation remnant is bi-faced and cobble filled. Feature C appears to have been dismantled and utilized for the construction Feature B to the south. (Guerriero et al. 2006b:66) Feature C is situated within LCAw. 9564 to Kana (on TMK: (3) 9-5-014:035), and is not included within the current study area. This wall was briefly inspected during the most recent fieldwork and photographed. The wall is constructed of neatly stacked small to large pāhoehoe cobbles. It measures roughly 0.9 meters wide by 1.14 meters tall, and extends northwest from a point 10 meters mauka of Feature A, for 79 meters before terminating near the former alignment of the Site 29390 railroad bed. Although, Feature C is in fair condition and has retained most of its stacking, there are some sections of the wall that exhibit signs of collapse due to bulldozing activity and age. A short wall section located 35-meeters northwest of Feature C, on the opposite side of the railroad bed near the mauka boundary of LCAw. 9564 to Kana (on TMK: (3) 9-5-014:035), may be a former continuation of this

wall. This 8-meter long wall section stands 1 meter wide by 0.6 meters tall, and is comprised of collapsed pāhoehoe cobbles. Both ends of the wall section currently terminate at bulldozing.

**Feature D**

Feature D consists of a mauka/makai core-filled wall located 184 meters southwest of Feature B. This wall was previously described as "a historic property boundary wall…constructed of a'a sub-angular basalt cobbles," that "measures approximately 1m high by 0.4m wide and is 96.5m long orientated northeast and southwest" (Guerriero et al. 2006b:66). During the current survey, Feature D was relocated and the description updated to reflect its current condition and measurements. This wall extends, from near Highway 11, northwest across TMK: (3) 9-5 014:017 (within the current study area) for 110 meters, approximating the northern boundary of LCAw. 9668 to Nana. The wall, which measures 0.7 to 1 meter wide and stands 0.9 meters tall, is constructed of stacked small to large cobbles. It is mostly intact with only a few sections of collapse; several trees, including a large banyan, have impacted the structural integrity of the wall and contributed to the collapse. Several wooden posts with nails sticking out of them protrude from the top of the wall, a barbed wire fence follows the northern edge of Feature D for its entire length. A metal waterline also crosses the wall. Feature D is depicted on a map of the Hawai'i Belt Road right-of-way prepared in 1940 (C.S.F. 9672-9674), indicating that it was certainly constructed prior to that date. At the makai end of Feature D is a low-lying terrace wall within an area of bulldozed pasture. It appears that this wall may have been previously bulldozed, and only the base of the wall remains. The remaining wall base is double lined with large cobbles on either edge with soil in between. The makai edge of the wall measures roughly 9 meters long by 70 centimeters wide and stands up to 20 centimeters tall. At its northern end, the wall turns mauka for 6.5 meters. At the turn in the wall is a pile of cobbles measuring 2.2 meters wide that appears to have been deposited by a bulldozer.

**Feature E**

Feature E consists of a short section of core-filled wall located 65 meters northeast of Feature D. This wall extends from near Highway 11, northwest for 11.3 meters, approximating the southern boundary of LCAw. 9564 to Kana (along the boundary between TMKs: (3) 9-5-014:011 and 017). It measures 0.7 meters wide by up to 1 meter tall, and is constructed of stacked pāhoehoe cobbles. The northwestern end of the wall terminates at collapse caused by bulldozing. A barbed wire fence follows the southern wall edge and continues beyond the wall termination to the northwest. Feature E is depicted on a map of the Hawai'i Belt Road right-of-way prepared in 1940 (C.S.F. 9672-9674), indicating that it was certainly constructed prior to that date. On that map, a wall is shown extending to the southwest from Feature E, but no evidence of that former wall was found. Currently, the wall is in poor condition.

**Feature F**

Feature F consists of a core-filled wall located roughly 173 meters southwest of Feature E. This wall extends from near Highway 11, northwest for 30 meters, along the shared boundary between LCAw. 9668 to Nana (TMK: (3) 9-5-014:010) and LCAw. 10323 to Pae (TMK: (3) 9-5-014: 017). Feature F is constructed of stacked/collapsed cobbles and boulders. It has a width of 0.7 meters, and ranges in height from 0.7 to 1.4 meters tall. The wall is in generally poor condition. Its eastern end terminates near the highway, while its western end terminates at bulldozed pasture. A barbed wire fence follows the southern edge of the wall for its entire length. Feature F is depicted on a

> map of the Hawai'i Belt Road right-of-way prepared in 1940 (C.S.F. 9672-9674), indicating that it was certainly constructed prior to that date. On that map, a wall is shown extending to the southwest from Feature E, but no evidence of that former wall was found. (Clark and Rechtman 2019:280-290)

As stated, Site 24412 was interpreted as a complex of boundary features by Clark and Rechtman (2019). The site was assessed as significant for its information content (Criterion "d") and was recommended for no further work (2019:413).

### Site 50-10-74-26921

Site 26921 is a complex of 65 basins within 12 distinct areas (Features A-L) that have been pecked into the coastal bedrock. The site is situated along the shoreline at the northeast end of Honu'apo Bay, adjacent to the former location of the Kamala'i Heiau (Site 3853), in the areas examined by Clark et al. (2013; see **Figure 4**). A plan map of the site is presented in **Figure 60** with a photographs of selected basins presented in **Figure 59** and **Figure 62**. The site is described as follows:

> Site 26921 consists a series of artificial basins in the coastal bedrock shelf along the eastern shore of the Honu'apo Bay. Sixty-five basins are present at twelve distinct locations (Features A-L) near the ocean between the northeastern point of the bay and the pond at the inland side of the bay. Four of the locations (Features B, C, F, and G) are single isolated basins, while the eight other locations (Features A, D, E, H, I, J, K, and L) are groupings of two or more basins. Feature L is the largest grouping, containing 18 individual basins. The largest recorded individual basin measures 90 by 55 centimeters (Feature L-12) and the smallest recorded basin measures 10 by 10 centimeters (Feature H-3). The basins range in depth from 2 centimeters to 30 centimeters. Most of the basins are round or oval in shape with rounded bottoms, but some are irregularly shaped, and others have nearly vertical walls and flat bottoms. Several of the basins are covered by water at high tide, and some of the bedrock surfaces that contain the basins are only accessible at low tide by crossing bedrock that is covered by water at high tide.
>
> These basins are common coastal features on the island of Hawai'i. Precontact Hawaiians created the basins by pecking, pounding, and grinding the pahoehoe bedrock surface with hammer stones, or by abrasion with sand, stones, and pounders (Apple and Macdonald 1966). Kirch suggests that the smaller ones "were used as bait cups, in which chum was pounded prior to fishing, and where fish poison could be prepared", and that, "the larger ones were salt pans, where sea water was evaporated to extract salt" (1985:273). Stokes (1957), who recorded a number of similar basins at Honaunau Bay in South Kona, offered several other possible interpretations for the uses of these features:
>
> > Some are oval, about the size and shape of a baby's bath tub, and were used for tanning nets; others of smaller size are circular, and were mortars for pounding the tasty seaweeds; smaller ones yet were for pounding salt; while on the edge of the lava and overlooking the sea may be seen others, still smaller, for pounding crabs and sea-urchins as *hauna*, or chum to attract fish ... Some large single mortars [basins] further down the coast were also used for dyeing tapa ... We must not get the idea, however, that a mortar was only used for one purpose. As it grew in size by use it would undoubtedly serve the purpose for which its

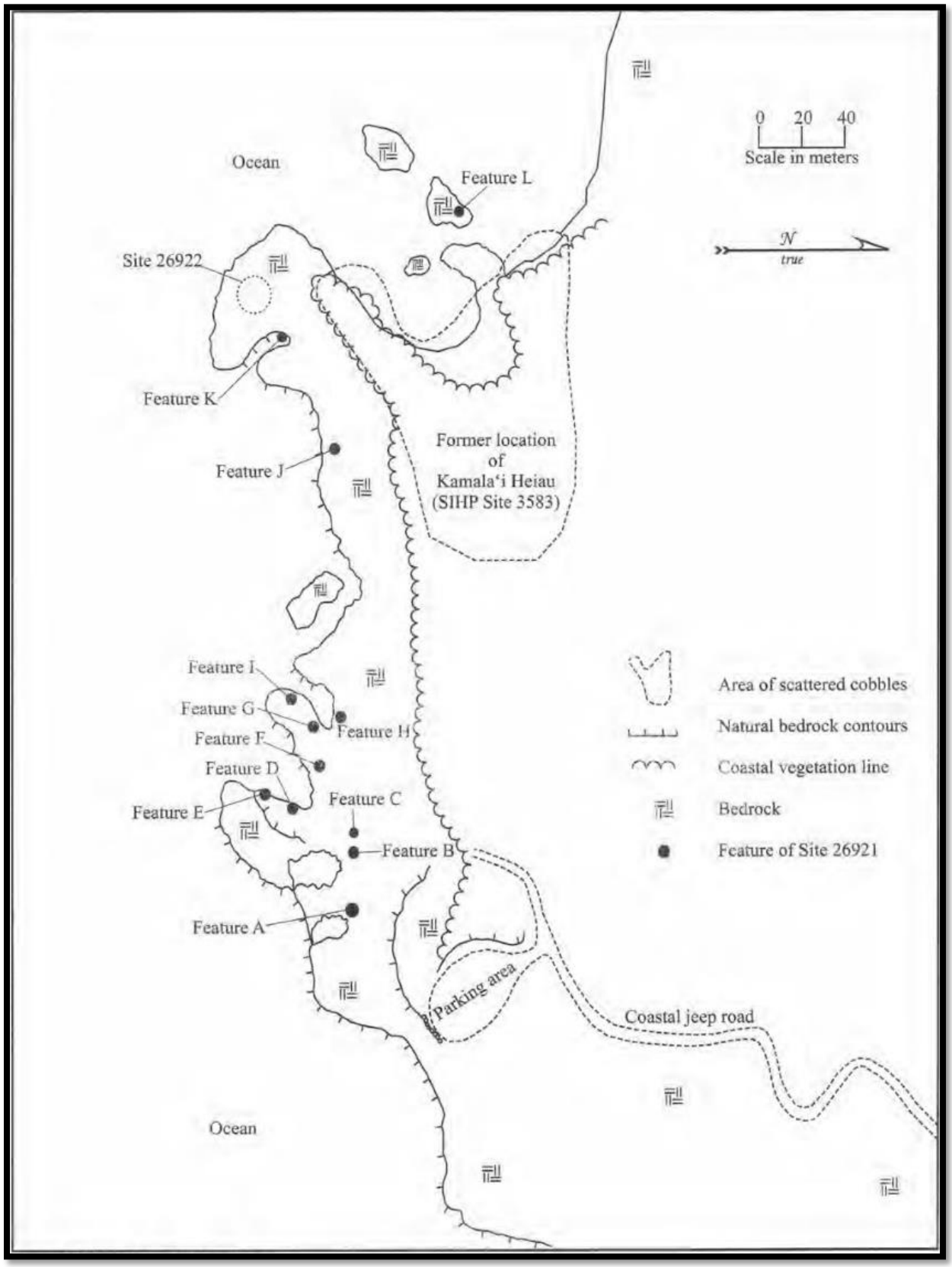


**Figure 60. Plan map of Site 2691 (from Clark et al. 2013:54).**

**Figure 61. Site 26921, Feature A-3 basin (view to west; from Clark et al. 2013:55).**

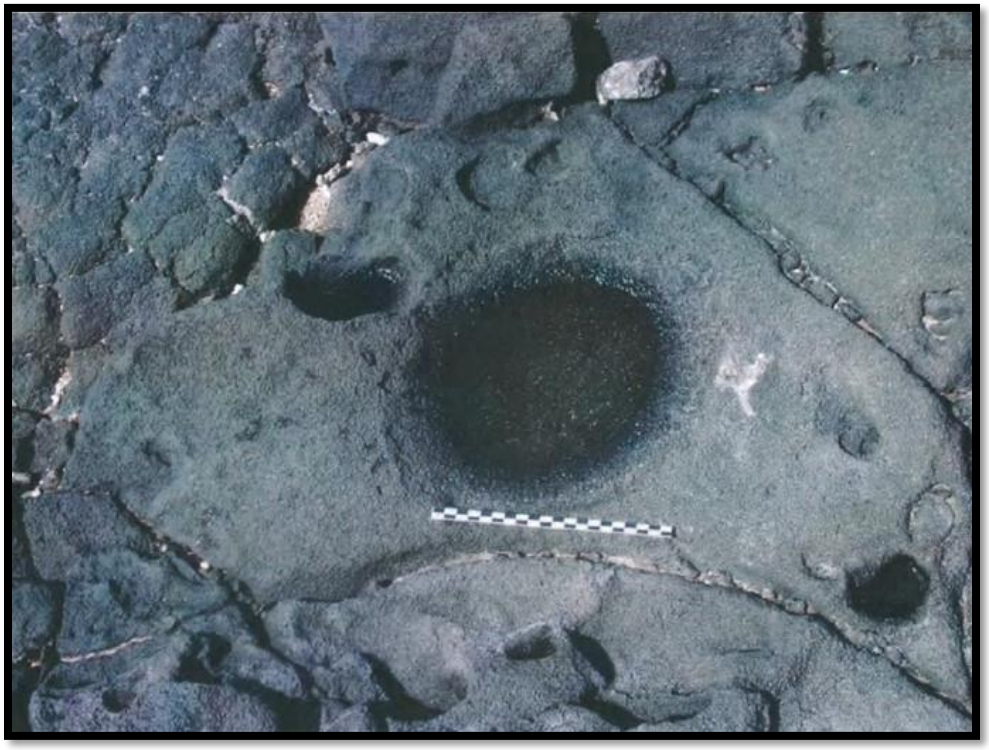

**Figure 62. Site 26921, Feature B basin (view to south; from Clark et al. 2013:56).**

> size adapted it... The tanning tanks above ordinary high tide are still in operation. (Stokes 1957:199-200in Apple and Macdonald:1966:130)

Apple and Macdonald, paraphrasing Stokes (1957:12), also add:

> In the Honaunau area some of the artificial concavities also held sticks which marked taboo areas or held wooden religious images. Their steep sides and depth held the sticks or images upright, and both were perhaps also lodged in upright positions by stones. Some of the image holes are now under water (1966:130).

Each of the features recorded at Site 26921 is described below and their locations relative to one another and the coastline... Specific interpretations are not offered for individual basins, as several alternative uses are possible for each. Basins that are inundated with sea water at high tide are indicated, and those that naturally collect salt, or contained salt at the time of the current fieldwork are also indicated. Generally it appears that, as posited by Kirch (1985) the shallower basins were for salt collection, and that the deeper basins may have been bait cups, or used for some such similar purpose. It is conceivable that some of the deepest most cylindrical basins may have, as suggested by Stokes (1957), held sticks or images in upright to mark kapu areas. This is especially true of those in the immediate vicinity of Kamala'i Heiau (Site 3583).

Feature A consists of three basins located near the northeastern point of Honu'apo Bay. The basins are contained within a 6.5 meter by 6.0 meter area of honeycombed bedrock along the northwestern edge of a shallow tide pool. The three basins measure: (1) 28 centimeters by 25 centimeters by 10 centimeters deep, (2) 27 centimeters by 20 centimeters by 6 centimeters deep, and (3) 25 centimeters by 20 centimeters by 12 centimeters deep. All three of these basins naturally collect salt, and contained small amounts of salt at the time of the current fieldwork. Within the Feature A area there are an additional (roughly) twenty naturally occurring shallow depressions that also collect salt, but were not artificially created for that purpose.

Feature B consists of an isolated basin that measures 33 centimeters by 28 centimeters by 6 centimeters deep. It is located along the northern edge of a shallow tide pool. Feature B is covered by water at high tide, and it contained sea water at the time of the current fieldwork .

Feature C consists of a single basin located roughly ten meters west of Feature B. This basin measures 20 centimeters by 20 centimeters in diameter by 7 centimeters deep. Although well inland from the high tide line, Feature C naturally collects salt, and at the time of the current fieldwork a thin layer of salt was present within it.

Feature D consists of five small basins located along the eastern edge of a shallow inlet. The basins are contained within 3.7 meter by 1.0 meter area. Two of the basins are relatively deep while three are fairly shallow. All are somewhat crude compared to other basins recorded at Site 26921. The basins measure: (1) 15 centimeters by 12 centimeters by 3 centimeters deep, (2) 20 centimeters by 20 centimeters by 10 centimeters deep, (3) 13 centimeters by 12 centimeters by 2 centimeters deep, ( 4) 18 centimeters by 17 centimeters by 7 centimeters deep, and ( 5) 13 centimeters by 12 centimeters by 2 centimeters deep. Based on the location of Feature D, it is likely that all of these basins are covered by sea water during extreme high tides.

Feature E consists of five basins contained within a 3 meter by 2 meter area along the east edge of a shallow inlet ten meters southwest of Feature D. The basins are organized in two distinct

groupings, a western group (two basins) and an eastern group (three basins). The eastern basins are connected in a line; two of them are deep, and one is shallow. Only one basin in the western group is deep, while the other is shallow. The basins in the western group measure: (1) 18 centimeters by 15 centimeters by 5 centimeters deep and (2) 20 centimeters by 19 centimeters by 21 centimeters deep. The basins in the eastern group measure: (3) 12 centimeters by 12 centimeters by 5 centimeters deep, (4) 21 centimeters by 19 centimeters by 15 centimeters deep, and (5) 20 centimeters by 20 centimeters by 16 centimeters deep. The western basins are covered at high tide, and both contained sea water at the time of the current fieldwork.

Feature F is an isolated cylindrical basin that measures 23 centimeters in diameter by 15 centimeters deep. It is located along the north edge of a shallow inlet across from (northwest of) Features D and E. Feature Fis nearby the ocean and it likely gets inundated by water occasionally during high tides.

Feature G is a shallow basin located twenty meters west of Feature F along the eastern edge of a small inlet. The basin measures 17 centimeters by 15 centimeters by 5 centimeters deep. It is located on low-lying bedrock that gets covered by water at high tide.

Feature H consists of three shallow basins all located within 1.4 meters of one another. They are located along the north edge of a shallow inlet across from (eight meters north of) Feature G. The basins measure: (1) 14 centimeters by 14 centimeters by 5 centimeters deep, (2) 25 centimeters by 23 centimeters by 7 centimeters deep, and (3) 10 centimeters by 10 centimeters by 4 centimeters deep. All three get covered by water at high tide, and each contained sea water at the time of the current fieldwork.

Feature I consists of six basins and an area of shallow pecking (the possible start to basin) located eighteen meters southwest of Feature G. The basins are contained within a ten meter area on a finger of bedrock that juts out into the bay. Five of the basins are deep and two are shallow. These basins measure from northeast to southwest: (1) 15 centimeters by 15 centimeters by 2 centimeters deep, (2) 15 centimeters by 15 centimeters by 5 centimeters deep, (3) 27 centimeters by 26 centimeters by 20 centimeters deep, (4) 30 centimeters by 27 centimeters by 22 centimeters deep, (5) 22 centimeters by 22 centimeters by 11 centimeters deep, (6) 30 centimeters by 28 centimeters by 26 centimeters deep, and (7) (possible pecking) 42 centimeters by 42 centimeters by 1 centimeter deep.

Feature K is an isolated basin that measures 27 centimeters by 19 centimeters by 6 centimeters deep. It is located along the northeastern edge of a narrow inlet to the northeast of Site 26922. The basin, which is shallow and oval in shape, is located on a west-facing, sloped bedrock surface.

Feature L consists of eighteen basins that occupy a ten meter by eight meter area on a bedrock island near the former location of Kamala'i Heiau (Site 3583). Feature L is inaccessible at high tide, except by wading. These basins get covered at extreme high tide by water and waves, and at the time of the current fieldwork several contained sea water. The bedrock island is surrounded by shallow pools. This was the largest grouping of basins recorded, and it contained some of the largest individual basins recorded at Site 26921. The basins measure, from northeast to southwest: (1) 20 centimeters in diameter by 12 centimeters deep, (2) 28 centimeters by 34 centimeters by 20 centimeters deep, (3) 28 centimeters by 30 centimeters by 12 centimeters deep, (4) 26 centimeters by 22 centimeters by 10 centimeters deep, (5) 50 centimeters by 60 centimeters in diameter by 20 centimeters deep, (6) 40 centimeters by 30 centimeters by 20 centimeters deep,

> (7) 20 centimeters in diameter by 16 centimeters deep, (8) 20 centimeters in diameter by 5 centimeters deep, (9) 20 centimeters in diameter by 5 centimeters deep, (10) 70 centimeters by 40 centimeters by 22 centimeters deep, (11) 40 centimeters in diameter by 20 centimeters deep, (12) 55 centimeters by 95 centimeters by 30 centimeters deep, (13) 20 centimeters in diameter by 6 centimeters deep, (14) 35 centimeters in diameter by 20 centimeters deep, (15) 50 centimeters by 40 centimeters by 25 centimeters deep, (16) 30 centimeters by 40 centimeters by 6 centimeters deep, (17) 15 centimeters in diameter by 10 centimeters deep, and ( 18) 15 centimeters by 20 centimeters by 8 centimeters deep. The largest basin L-12 is unusual in that it is kidney shaped. L-10 is a double basin with a small shallow one attached to the edge of a larger deeper one. The rest are all roughly circular or oval shaped. (Clark et al. 2013:53-61)

As stated above, the basins at Site 26921 were interpreted as either salt collection basins or bait cups used to store small fish. The site was assessed as significant for its information content (Criterion "d") and for its cultural value to the Hawaiian people (Criterion "e") by Clark et al. (2013:284). Based on the expressed preservation goals of the County of Hawai'i and Ka 'Ohana O Honu'apo, all of the sites identified by Clark et al. (2013), including Site 26921 were recommended for preservation (2013:285).

### Site 50-10-74-26922

Site 26921 is the remnants of an historic survey marker located on the coastal bedrock promontory at the northern end of Honu'apo Bay (see **Figure 4**). The site was identified by Clark et al. (2013) and is located to the south-southwest of the former location of the Kamala'i Heiau (Site 3853), and the Feature K basins of Site 26921. Photographs of the site are presented in **Figure 63** and **Figure 64**. The site is described by Clark et al. (2013) as follows:

> Site 26922 consists of the remains of a Historic survey marker located on an exposed bedrock formation at the northeastern point of Honu'apo Bay. The site includes a partially collapsed stone and mortar survey monument and the base of upright metal pole anchored to the bedrock ground surface with a plaster-like compound. The metal pole is located 8.2 meters to the northwest of the stone and mortar monument. The rusted pole measures six centimeters in diameter. It must have formerly protruded above the bedrock ground surface, but has broken, and the top of the pole is currently level with the plaster-like compound in which it is anchored. This pinkish-white plaster-like material forms an irregularly shaped patch on the bedrock that measures 0.4 meters by 0.5 meters with the pole in its center. An inscription in the plaster contains the name "WILCOX" to the west of the metal pole, the initials "B.H.C." to the north of it, and the date "2-25-27" to the south of it. A waterworn pebble is stuck in the plaster-like material beneath the name "WILCOX," but above the remains of a metal pole.
>
> The nearby survey monument is constructed of stacked pahoehoe cobbles standing four to five courses high. The cobbles are held together with mortar made of sand, shell, and coral. The monument was formerly round, measuring roughly 3 .0 meters in diameter by up to 1.0 meter tall, but it is in poor condition and exhibits severe collapse along its southeastern edge (Figure 58). Heights along this collapsed edge range from 0.6 to 0.8 meters above the surrounding p**a**hoehoe ground surface. The collapse has revealed that only the cobbles along the exterior edges of the survey monument are held together with mortar; the interior contains a fill of loose cobbles. The top surface was formerly paved with mortar, but due to the collapse, it has sloughed to the southeast and only one large section remains, although it is no longer in its original position.
>
> This historic survey marker is nearly identical in construction to two other historic survey markers

**Figure 63. Site 26922 survey marker (from Clark et al. 2013:69).**

**Figure 64. Site 26922 survey monument (view to southeast; from Clark et al. 2013:70).**

> recorded by Clark and Rechtman (2004) and Rechtman (2007). Those markers had inscriptions that indicated they were created in 1938 and 1928 respectively during the Hawai'i Territorial Survey of Ka'u. Based on the analogous form of this monument, it likely that it dates to the same time period, and that it post-dates the 1927 "WILCOX" marker. (Clark et al. 2013:69)

As stated, Site 26922 is interpreted as a survey marker created during the Hawai'i Territorial Survey of Ka'ū, likely between 1928 and 1938. The site was assessed as significant for its information content (Criterion "d") and was recommended for preservation (2013:284-285).

### Site 50-10-74-26923

Site 26923 is the remnants of an L-shaped enclosure situated inland of Hanakaulua Bay, near the northeastern end of the current study area (see **Figure 4**). The site was initially identified by Ayres (1970) as Site B13-50 and was subsequently documented by Clark et al. (2013) and assigned its current SIHP site designation. A plan map of the site is presented in **Figure 65** with a photograph of the structure presented in **Figure 66**. The site is described as follows:

> Site 26923 consists of an L-shaped enclosure remnant located eight meters southeast of the costal jeep road within Honu**'**apo Ahupua**'**a . It is built on a level p**a**hoehoe bedrock ground surface at the top edge of a southeast facing bedrock slope. The enclosure is constructed of stacked/piled small to large pahoehoe cobbles. The L-shaped wall measures 7.5 meters (northeast/southwest) by 5.0 meters (northwest/southeast) and averages roughly 1.5 meters wide. The enclosure wall is mostly collapsed with a mounded appearance, but intact sections along the interior edge of the wall are loosely stacked one to three courses (up to 50 centimeters) tall. Much of the southeast facing exterior wall edge has tumbled down the bedrock slope along that side, but there are two upright bedrock slabs placed along this edge that help retain the cobble material used in the feature's construction. Two bedrock areas on the slope below Site 26923 appear excavated, and are likely the source of the cobbles used to construct the enclosure. The interior of Site 26923 to the northwest of the wall consists primarily of exposed bedrock with some thin soil pockets and scattered cobbles also present. Marine shell fragments (Cellana and Cypraea) were observed at two locations within the enclosure, one concentration along the interior north edge, and a smaller scatter at the southwestern end of the wall. A series of modern soil debris piles are present along the eastern edge of the coastal jeep road two meters north of the enclosure.
>
> Site 26923, based on the presence of marine shell and the crude nature of the construction, was likely used for Precontact coastal habitation purposes on a short-term or recurrent basis. The location of Site 26923 suggests that it may have served as a temporary shelter for fishermen or others gathering near shore coastal resources. The walls of the enclosure are oriented to block the prevailing trade winds, which often exceed twenty miles per hour at the coast. Ayres (1970) who recorded Site 26923 as B13-50 noted that this L-shaped structure had a small fireplace at the long leg of the L, and that a chip from the polished surface of an adze of dark-grey or black basalt was found. Neither the fireplace nor the adze chip were relocated during the current study. Bulldozing and dumping along the coastal jeep road during historic and modern times has severely altered the landscape in the vicinity of Site 26923, and these land disturbances could have also altered the formal attributes of the enclosure itself. (Clark et al. 2013:71)

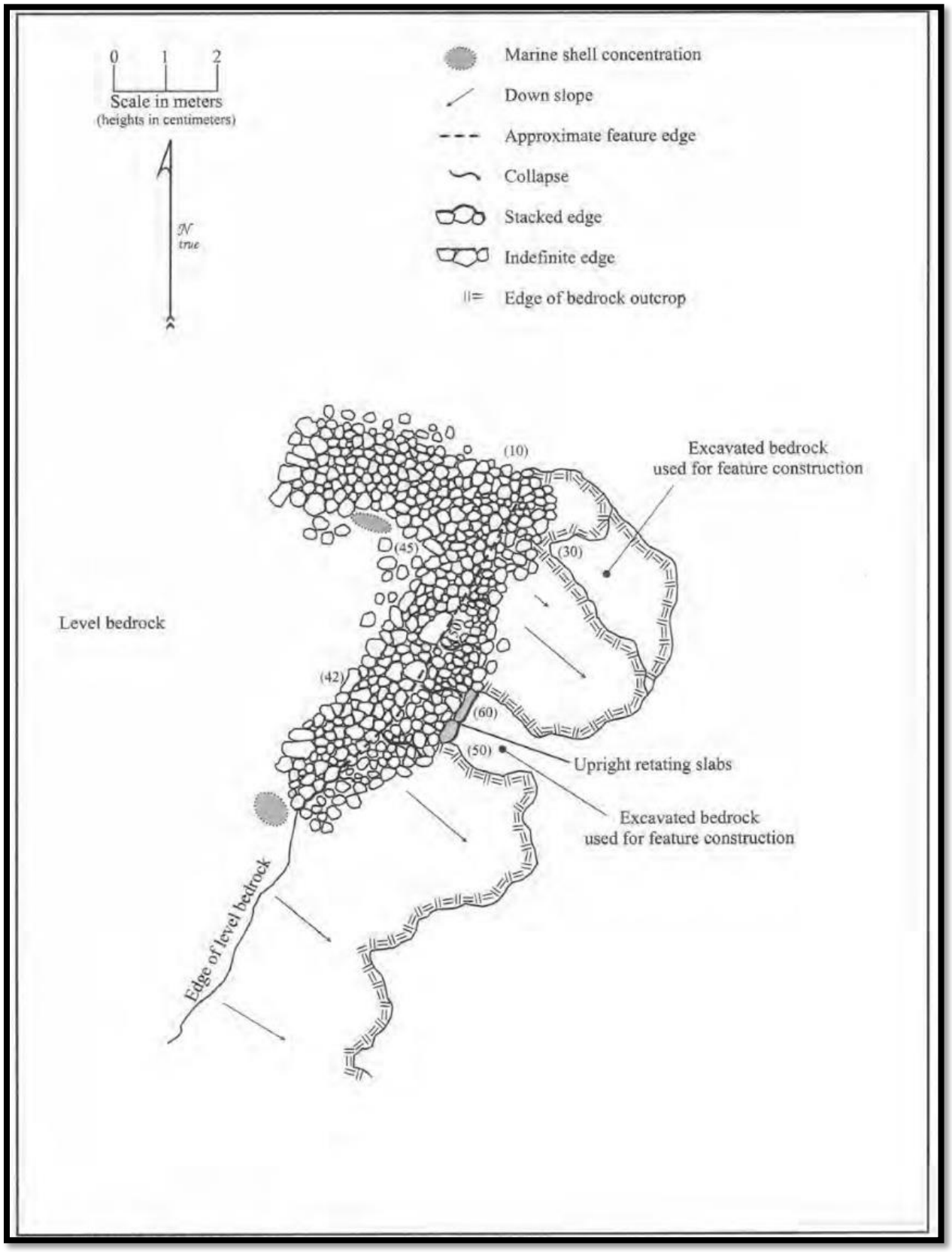


**Figure 65. Plan map of Site 26923 (from Clark et al. 2013:72).**

**Figure 66. Site 26923 enclosure (view to south; From Clark et al. 2013:73).**

assessed as significant for its information content (Criterion "d") and was recommended for preservation by Clark et al. (2013:284-285).

## Site 50-10-74-26924

Site 26924 is a complex of two features located inland of Hanakaulua Bay, near the northeastern end of the current study area (see **Figure 4**). The site was initially identified by Ayres (1970) as Site B13-54 and B13-54 and was subsequently documented by Clark et al. (2013) and assigned its current SIHP site designation. A plan map of the site is presented in **Figure 67** with photographs of the features presented in **Figure 68** and **Figure 69**. It is described as follows:

> Site 26924 consists of an enclosure remnant (Feature A) and a nearby alignment (Feature B) located on either side of the coastal jeep road in Honu'apo Ahupua'a. The site occupies a twenty-five meter by twenty-five meter area on a raised section of pahoehoe bedrock. The features of Site 26924 were originally recorded by Ayres (1970) as B 13-54 and B 13-55, a large enclosure with possible internal dividing walls and a small enclosure/house site. Feature A, the large enclosure (B 13-54), is shown on Ayres (1970) map as a three sided enclosure with a wall running west from its northwestern comer. Since the time of Ayres' study, however, the coastal jeep road has bisected the enclosure and the berm for the ponding basins has destroyed the wall. The mauka and makai sections of Feature A are now separated by a twelve meter gap where the jeep road destroyed a portion of the enclosure wall. Bulldozing for the coastal jeep road also severely impacted Feature B (B13-55), which currently consists of a single alignment, and no longer resembles an enclosure. Site 26924, based on the formal attributes of the features and the presence of marine shell and volcanic glass scattered about the site area, appears to have been used for Precontact habitation purposes. Detailed descriptions of Features A and B follow below…

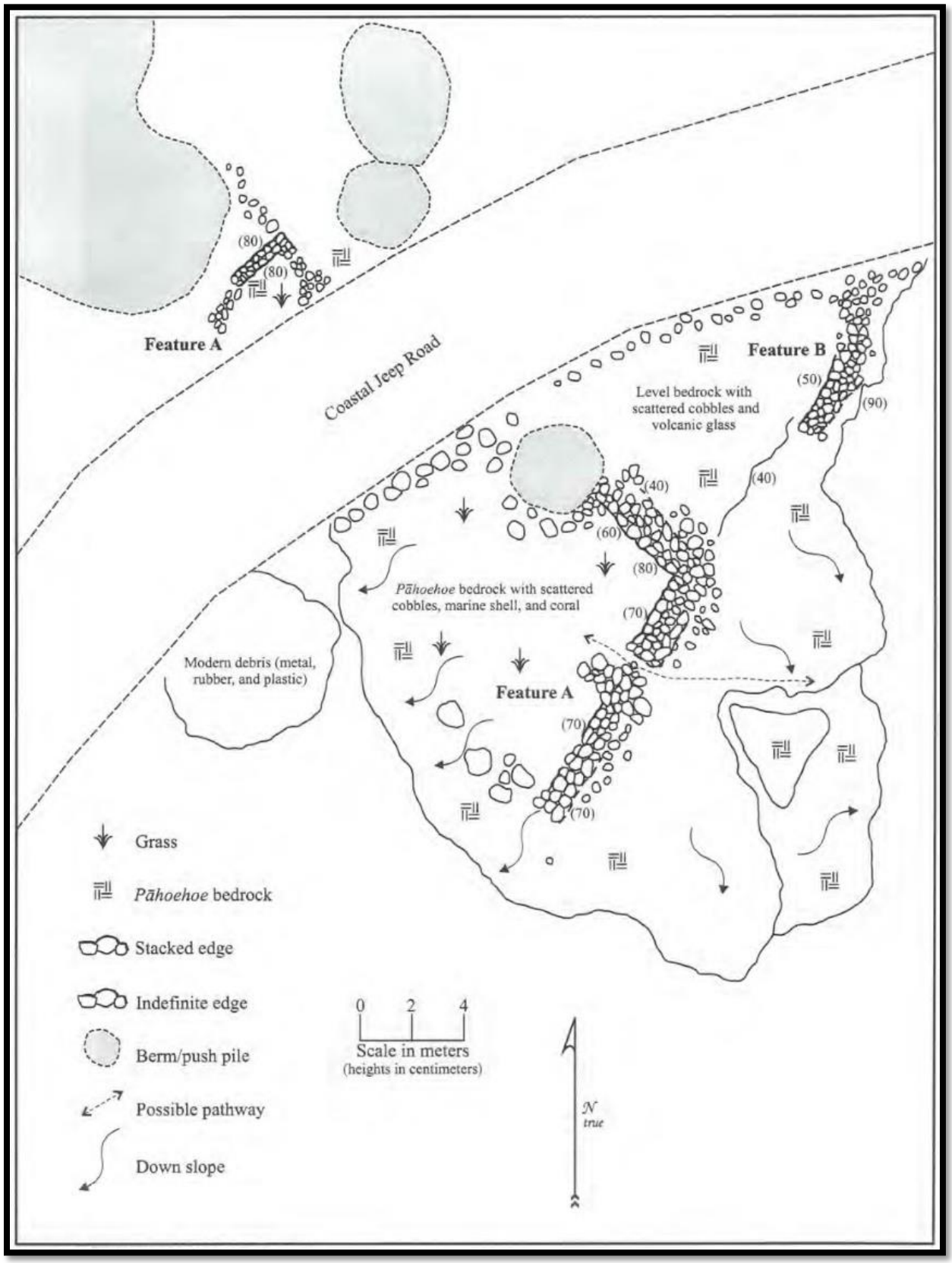


**Figure 67. Plan map of Site 26924 (from Clark et al. 2013:75).**

**Figure 68. Site 26924, Feature A enclosure (view to south; from Clark et al. 2013:76).**

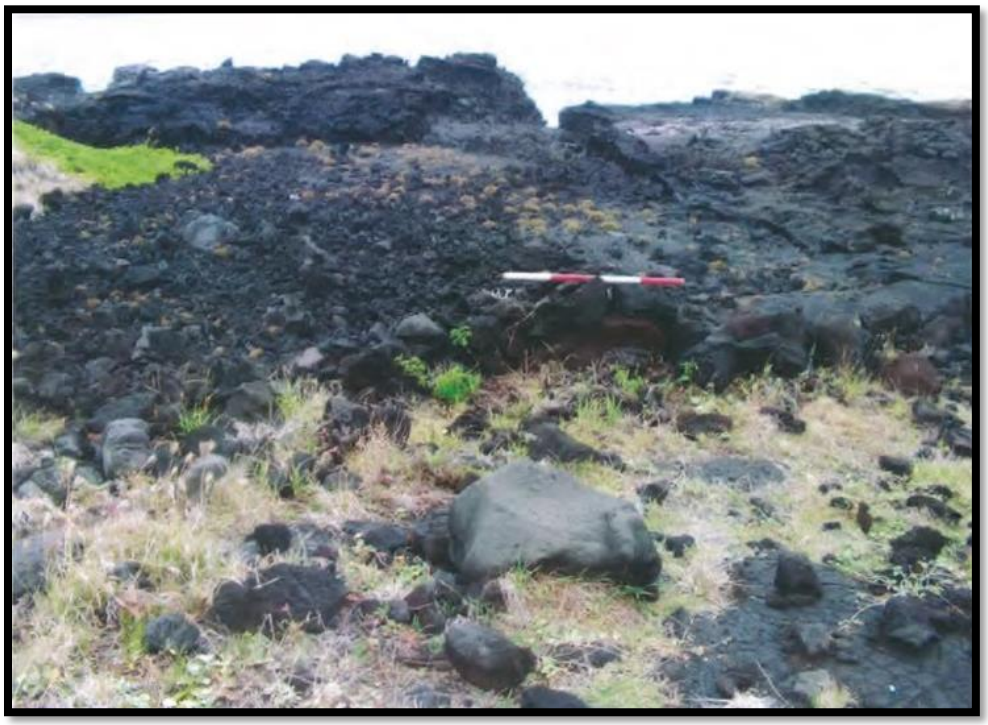

**Figure 69. Site 26924, Feature B alignment (view to southeast; from Clark et al. 2013:78).**

**Feature A**

Feature A is a large three-sided enclosure remnant located at the southwestern extent of Site 26924. Feature A has the overall measurements of twenty-one meters (northwest/southeast) by eleven meters (northeast/southwest), but it has been bisected by the coastal jeep road into two separate L-shaped sections. Both sections open to the southwest. The section makai (southeast) of the jeep road measures 11.0 meters by 5.6 meters. The northeast/southwest running wall measures eleven meters long. This wall is constructed of loosely stacked small to large pahoehoe cobbles. It has an average width of 1.0 meter and stands up to 90 centimeters tall. There is a 1.0 meter gap centrally located in this wall section that may have served as an entryway to the feature. The northwest/southeast running wall segment measures 5.6 meters long by 0.8 to 1.0 meters wide. It too is constructed of loosely stacked small to large pahoehoe cobbles that stand up to 60 centimeters tall. To the northwest, where it would have continued to the mauka section of Feature A, the wall terminates at a bulldozed push pile that extends 4.5 meters to the coastal jeep road. The area enclosed by these two walls consists of exposed bedrock that slopes slightly to the southwest with some thin patches of soil and scattered cobbles present. A large amount of marine shell (including Drupa, Cellana, and Cypraea), volcanic glass debitage, water rounded coral, and kukui nutshell fragments were noted on ground surface within the enclosed area. To the south and west of the makai section of Feature A, the bedrock drops off steeply to the south and west away from the enclosure.

The mauka section of Feature A measures 4.1 meters (northeast/southwest) by 3.6 meters (southeast/northwest). This section is also constructed of loosely stacked small to large cobbles. It has wall widths that range from 60 to 80 centimeters, and intact portions of the wall stand up to 90 centimeters tall. A few cobbles trail off to the northwest for two meters from the corner of the mauka section of Feature A. These cobbles may have been the base of the wall recorded by Ayres (1970).

**Feature B**

Feature B consists of an alignment located 7.0 meters northeast of the southeast corner of Feature A, along the upper edge of a steep section of pahoehoe bedrock. The area between Feature A and Feature B consists of level bedrock with scattered marine shell and volcanic glass present. The Feature B alignment runs in a northeast/southwest direction for five meters. To the northeast the alignment terminates at cobble rubble along the makai edge of the coastal jeep road, but it may have formerly turned to the northwest forming an enclosure. Feature B is constructed of stacked small to large pahoehoe cobbles. The alignment stands up to 50 centimeters tall by 80 to 110 centimeters wide. (Clark et al. 2013:74)

Site 26924 is interpreted as a probable pre-contact permanent habitation complex based on the large area of the Feature A, and its formal type and construction. The site was assessed as significant for its information content (Criterion “d”) and was recommended for preservation (2013:284-285).

## Site 50-10-74-26926

Site 26926 is a complex of two features located inland of Hanakaulua Bay, near the northeastern end of the current study area (see **Figure 4** and **Figure 70**). The site was initially identified by Ayres (1970) as Site B13-51 and was subsequently documented by Clark et al. (2013) and assigned its current SIHP site designation. It is described as follows:

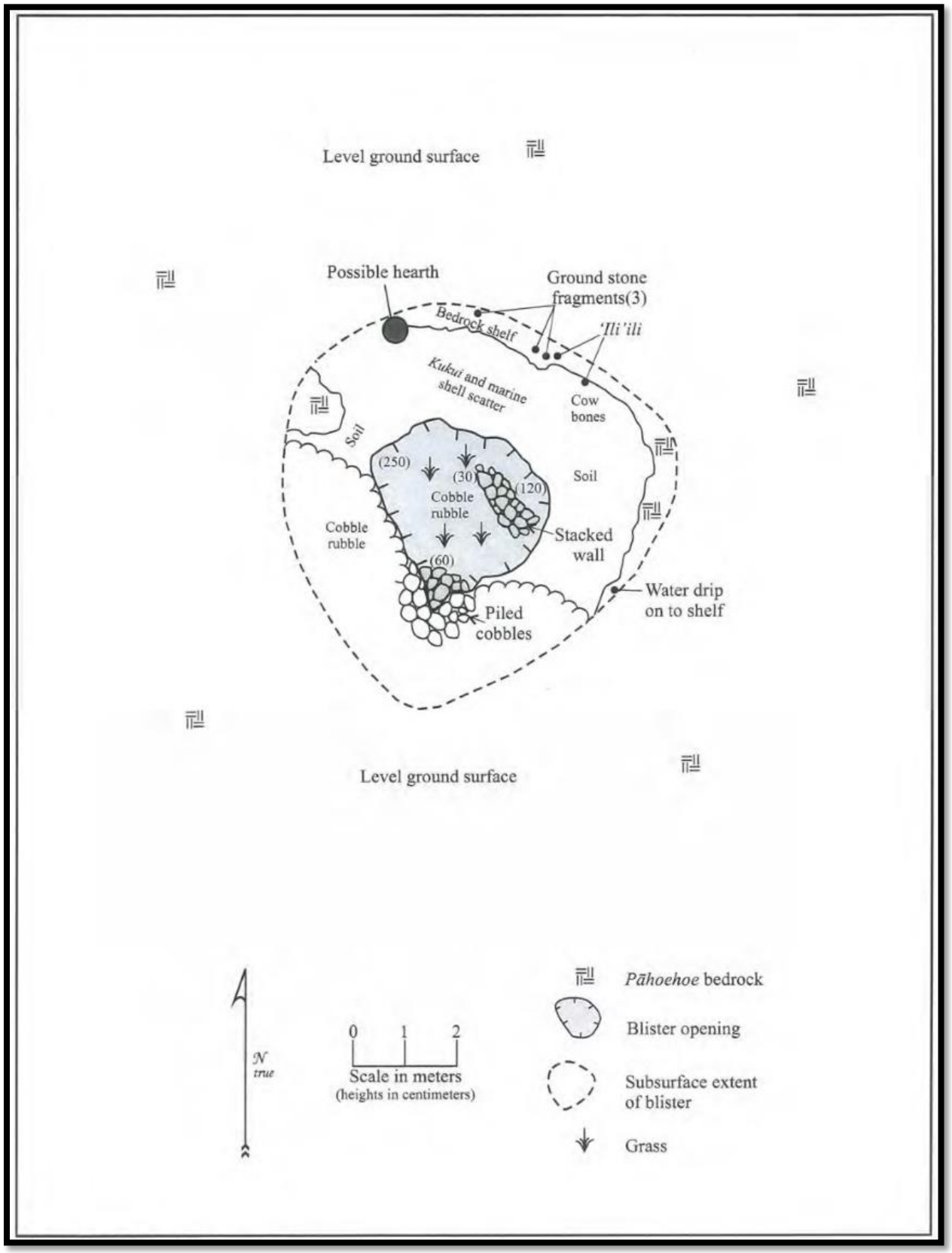


**Figure 70. Plan map of Site 26926 (from Clark et al. 2013:81).**

> Site 26926 consists of a lava blister located ten meters northwest of the coastal jeep road within Honu'apo Ahupua'a. The blister has an overall measurement of 8.0 meters by 8.0 meters. It contains a stacked wall, marine shell fragments, kukui nutshells, *'iii 'iii*, ground stone basalt fragments, fish bone, and charcoal, suggesting that it was utilized for Precontact habitation purposes.
>
> The blister is accessed through an irregularly shaped 3.5 meter by 3.5 meter vertical opening in a level pahoehoe bedrock ground surface. The opening, which is centrally located above the subsurface portion of Site 26926, is surrounded on all sides by pushed rock and soil material from the former ponding basins. The opening has a depth of 2.5 meters from the surface bedrock to the floor of the blister. Within the blister cobbles have been piled on a large boulder beneath the southern edge of the vertical bedrock entrance to allow for access. This entryway construction measures 1.5 meters in diameter by 0.6 meters tall, and its top surface sits 1.0 meter lower than the ground surface outside blister opening.
>
> Overhanging bedrock, that offers shelter from the sun, wind, and rain, is present on all sides of the central opening. To the south of the opening the overhang is filled with cobble rubble, and is inaccessible. The overhang to the north, east, and west of the opening, however, has been cleared of cobbles. Along these edges the overhang measures 2.0 to 3.0 meters deep by 1.0 to 1.8 meters tall from floor to ceiling. The cobbles cleared from these areas have been piled in the center of the blister beneath the opening. A stacked wall that measures 2.0 meters long by 0.9 meters wide by up to 1.2 meters tall is present on top of the piled cobbles. This wall helps protect the northeastern overhang area, which appears to be the main living space.
>
> The floor of the blister beneath the overhang along this edge consists of exposed bedrock and thin soil. Several marine shell fragments (primarily Cellana and Drupa), kukui nutshells, two *'iii 'iii*, and three rough ground stone basalt fragments (possibly from tools or tool manufacture) were present within this area, along with the skeleton of a cow. At the northern edge of the blister against the bedrock wall a 0.5 by 0.5 meter area of black soil covered in small cobbles and containing fishbone, charcoal, and marine shell was noted. This soil may be the remains of an old hearth. A water drip that puddles on bedrock on a small shelf along the eastern blister edge was also noted within Site 26926. (Clark et al. 2013:80).

Site 26924 is interpreted as a pre-contact temporary habitation shelter based on its for type and cultural material. The site was assessed as significant for its information content (Criterion "d") and was recommended for preservation (2013:284-285).

### Site 50-10-74-29390

Site 29390 is a portion of the former Hutchinson Plantation Railroad that extends through the Clark and Rechtman (2019) survey area inland of Highway 11 (see **Figure 4**). The railroad grade was constructed between approximately 1890 and the early 1940s and was used to transport sugar cane from the fields to the mills (Condé and Best 1973). A plan map of the site is presented in **Figure 71**, with a photograph of the railroad grade shown in **Figure 72**. The site is described by Clark and Rechtman (2019) as follows:

> Three sections of Site 29390 (described here as southwest, central, and northeast) are present within the current study area. These sections, with a total length of 2,175 meters (including breaks), are separated by areas of bulldozing, typically where the former railroad right-of-way has been incorporated into a more modern network of roads. All three sections are situated near the

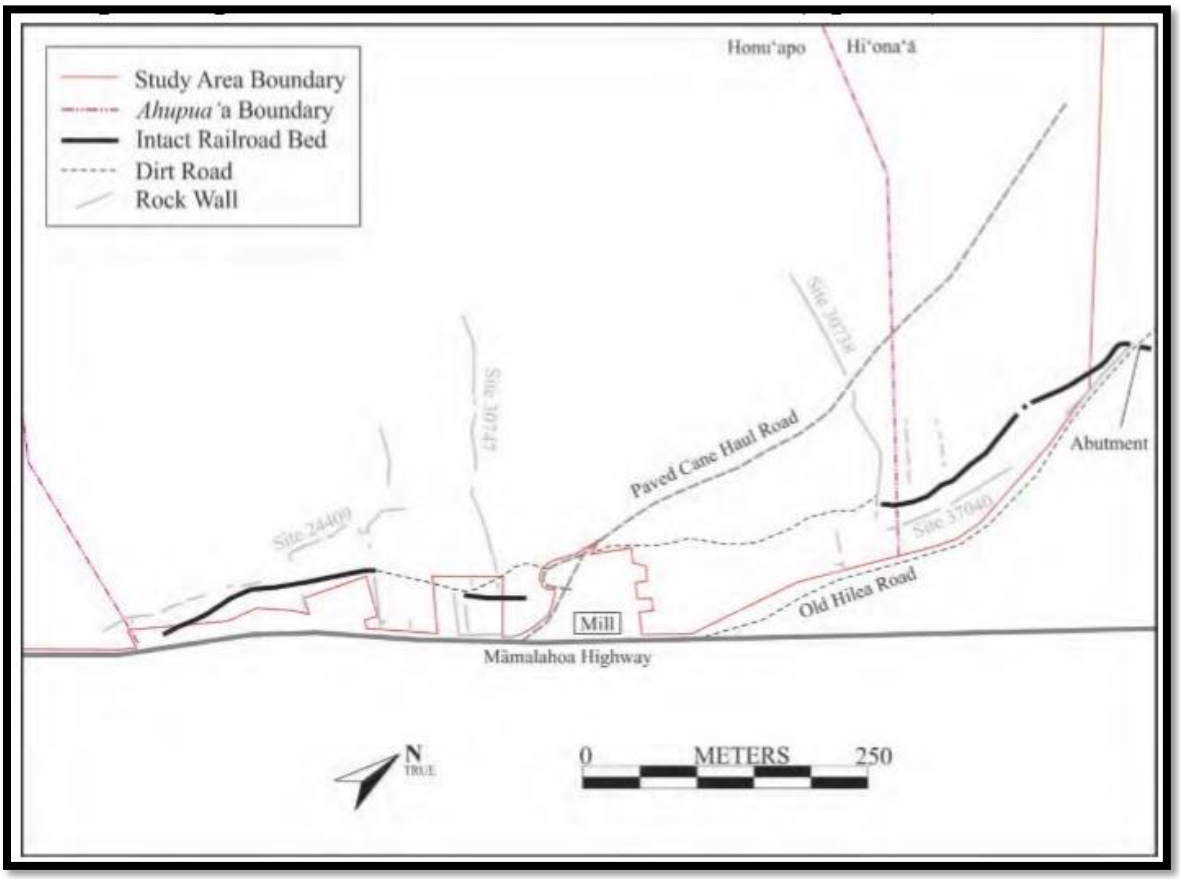


**Figure 71. Plan map of Site 29390 (from Clark and Rechtman 2019:292).**

**Figure 72. Site 29390 railroad grade (view to northeast; from Clark and Rechtman 2019:295).**

base of a steep slope within the more level, makai portion of the study area. The railroad bed itself maintains a gradual grade as it slopes down to the former Honu'apo Mill site from the southwest (from Na'alehu) and the northeast (from Hīlea). The grade cuts through raised landforms and is built up where it crosses low-spots. On average, the railroad bed measures 2.8 meters wide and has a surface of cobbles/gravels covered in soil and vegetation. The metal tracks and wooded ties are no longer present along the former route of the railroad, but a few iron spikes and bolts that once held the tracks in place were noted on the surface of the bed. The three sections of Site 29390 contained within the current study area are discussed below from southwest to northeast. The southwestern and central sections (between Na'alehu and the Honu'apo Mill) were abandoned and dismantled during the mid-1920s, while the northeastern section (between the Honu'apo Mill and Hīlea) was operated into the 1940s (Condé and Best 1973).

The southwest section of the railroad bed measures 505 meters long. Beginning at its southwestern end, adjacent to Highway 11, this section extends down a slightly steeper grade for 210 meters. This portion of the bed is cut into the hillside and the grade itself is lower than the surrounding terrain. The remainder of the southwest section, for a distance of 295 meters (where it crosses more level terrain), is terraced along its makai edge with stacked cobbles. The terracing ranges from 0.2 to 1.2 meters tall, but has been disturbed by bulldozing and tree roots in several areas, causing it to collapse outwards. To the northeast, this section of the railroad bed terminates at grubbed pasture near the northern corner of former LCAw. 9668 to Nana, where it blends into the surrounding terrain, and can no longer be followed. A 185-meter gap consisting of bulldozed pasture separates the southwest section from the central section. The route of the former railroad was likely a fairly straight line across this area connecting the two sections.

The central section of the railroad bed measures 160 meters long. Most of this portion of Site 29390 is situated on TMK: (3) 9-5-014:035 (within former LCAw. 9564 to Kana) and is not included within the current study area. Only the northeastern end of the central section extends into the current study area for a short distance (roughly 35 meters). This end of the central section crosses an intermittent drainage, and is built up along its makai edge with stacked cobbles, to a height of roughly 1.3 meters. Otherwise, the central section is mostly even with surrounding terrain, or cut slightly into it, with very little terracing. The northeast end of the central section terminates at bulldozing near the former Honu'apo mill site and the paved cane haul road that provides access to the property. An 860-meter gap separates the central section of Site 29390 from the northeast section, although a bulldozed road, built by the plantation to access three Modern well sites, appears to follow the former route of the railroad for roughly 400 meters prior to meeting the northeast section.

The northeast section of Site 29390 begins immediately north of the makai end of the Site 30738 wall (the railroad at this location appears to have been dismantled to build the Site 30738 wall). This section of the railroad bed, extending northeast from Site 30738 to the northern property boundary, measures 575 meters long, and was initially recorded by Guerriero et al. (2006b) as Feature C of Site 24410 (see above). The southwestern end of this section, for a distance of 385 meters (where it crosses fairly level terrain at the base of a steep slope), is terraced along its makai edge with neatly stacked cobbles standing 0.5 to 2.5 meters tall (Figure 337). The remaining 190 meters of this section, crosses a low-lying area and is terraced along both edges, to heights ranging from 1 to 3 meters. As the former railroad alignment exits the northern boundary of the study area, it once again joins a steep slope, and is terraced to height of 4 to 5 meters along its makai

> edge with neatly stacked cobbles. Beyond the northern boundary, the railroad bed continues 125 meters off property to the alignment of the old Hīlea Government Road, where a cobble and concrete abutment along the makai edge of the old roadway indicates there was once a bridge crossing the above the road onto the Hōkūkano ʻaʻā flow (Figure 340). (Clark and Rechtman 2019:291-296)

The Site 29390 is an historic mechanical transportation system used in conjunction with the sugarcane industry. The site was assessed as significant for associated with events that made important contributions to Hawaiian history (Criterion "a") and for its information content (Criterion "d"). The site was recommended for preservation by Clark and Rechtman 2019:413).

### Site 50-10-74-30738

Site 30738 is an historic stone wall that extends through the northeastern portion of the Clark and Rechtman (2019) survey area inland of Highway 11. Only the seaward portion of the wall is located within the current area of study (see **Figure 4**). A plan map of the site is presented in **Figure 73** and a photograph of the wall is presented in **Figure 74**. The wall is described by Clark and Rechtman (2019) as follows:

> Site 30738 consists of a core-filled wall that meanders east/west across TMK: (3) 9-5-014:017 in the northeastern portion of the study area for approximately 750 meters. This wall, situated within Honuʻapo Ahupuaʻa near its northern boundary with Hiʻonaʻa Ahupuaʻa, is depicted on an 1887 map of a portion of Kaʻū (Hawaiʻi Registered Map No. 1455 prepared by M.D. Monsarrat), indicating that it was built prior to that date. The wall, which was likely built for Historic ranching purposes, is constructed of small to large-sized pāhoehoe cobbles. It ranges from 0.7 to 1 meter wide, and has a fairly consistent height of roughly 1.2 meters tall. The wall crosses moderately to steeply sloping terrain that ranges from exposed bedrock to areas of deep soil. A barbed wire fence follows the northern edge of Site 30738 for its entire length, and connects from the eastern end of the wall to the Site 24410 corral.
>
> Site 30738 begins, at its eastern (makai) end, at the top of a steep section of slope, 40 meters southwest of the Site 30740 wall. It then extends northwest for roughly 160 meters, before turning and continuing in a more westerly direction for 150 meters to a paved cane-haul road, where a 45-meter section of the wall has been bulldozed away and replaced by a fence line and gate. The initial section of wall (40 to 60 meters from its eastern end) crosses the Site 25240 railroad alignment and a metal pipe line that once carried water from one of the plantation wells to the Honuʻapo Mill. Ten meters northwest of the pipe crossing, an improvised wire gate allows for vehicular access through the wall. West of the paved cane haul road, the wall continues in a westerly direction for nearly 400 meters to a point where the western end has been destroyed by bulldozing near the southeastern boundary of former LCAw. 9559 to Molina. Two short breaks are present in this section of the wall; one where a former cane road crosses it roughly 125 meters from its western termination, and another at the location of a former gate opening, roughly 10 meters from its western end. The barbed wire fence currently blocks access through the wall at both locations. The fence line turns southwest at the wall's western end and continues in that direction, where the 1887 map shows the wall may once have continued prior to being bulldozed. (Clark and Rechtman 2019:333-335)

Site 30738 was interpreted as an historic ranching wall used to restrict the movement of cattle. It was assessed as significant for its information content (Criterion "d") by Clark and Rechtman (2019:413) and recommended for no further work.

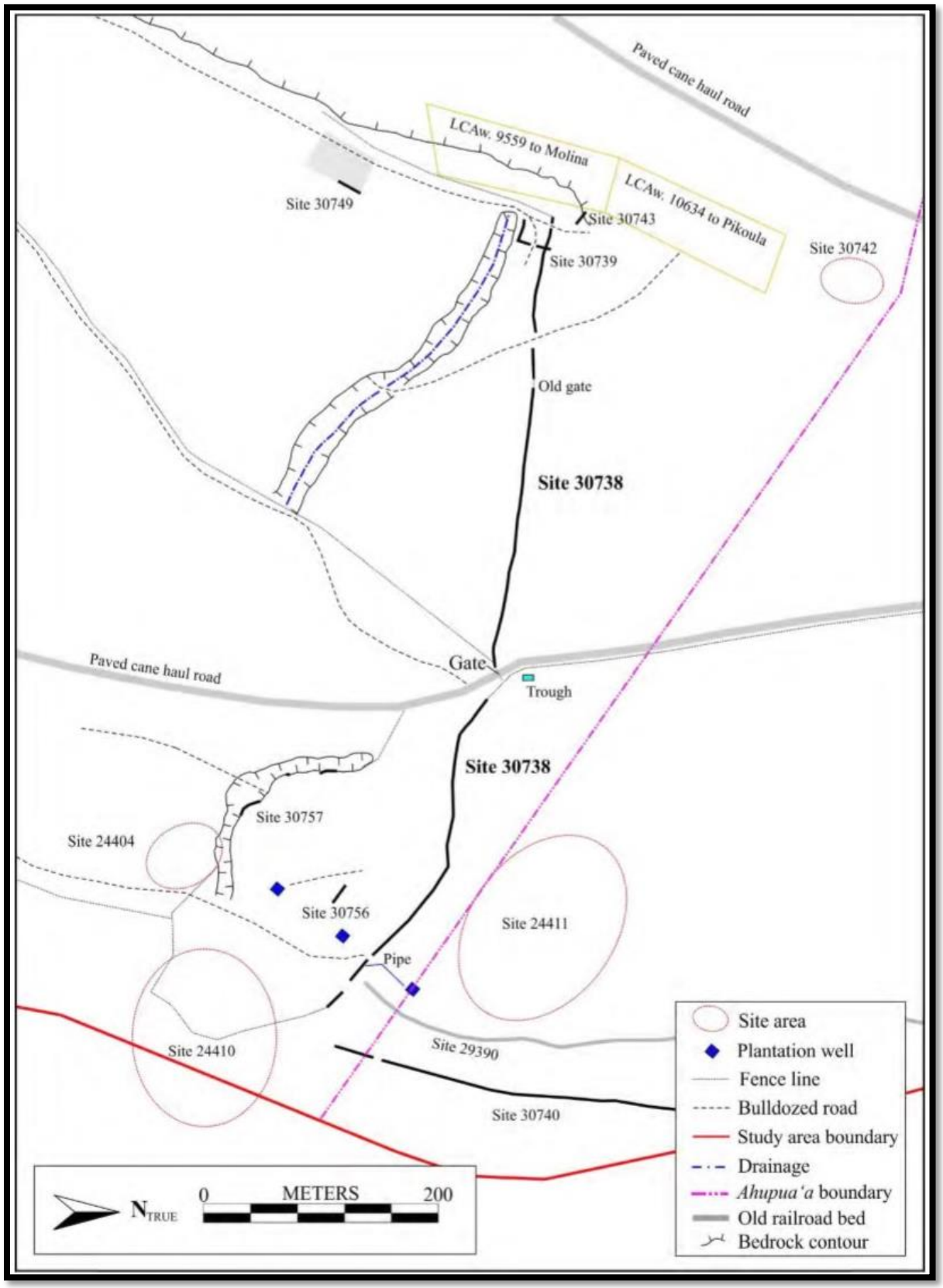


**Figure 73. Plan map of Site 30738 (from Clark and Rechtman 2019:337).**

**Figure 74. Site 30738 wall (view to east; from Clark and Rechtman 2019:336).**

## Site 50-10-74-30740

Site 30740 is an historic stone wall that extends through the northeastern portion of the Clark and Rechtman (2019) survey area inland of Highway 11. Only the southern portion of the wall is located within the current area of study (see **Figure 4**). A photograph of the wall is presented in **Figure 75**. The wall is described by Clark and Rechtman (2019) as follows:

> Site 30740 is a core-filled wall that extends northeast/southwest across TMK: (3) 9-5-014:017 in the northeastern corner of the study area for approximately 325 meters following the base of a steep slope where the terrain begins to level out near the seaward boundary of the subject property. The wall crosses the Hi'ona'a/Honu'apo ahupua'a boundary, but is situated primarily within former Grant No. 1367:1 to Leohaalulu (within Hi'ona'a Ahupua'a). This portion of the property is currently used as pasture and has been subject to multiple episodes of mechanical grubbing. Sections of the wall have been heavily impacted by these clearing activities, and both ends of Site 30740 currently terminate at bulldozing. Vegetation in the general vicinity of the wall is comprised primarily of Guinea grass, lantana, cat's claw, kiawe, Christmas-berry, and koa haole, along with other non-native weeds. Site 30740 is constructed of small to large-sized angular pāhoehoe cobbles on a level ground surface comprised of exposed bedrock with pockets of soil. The wall ranges from 0.4 to 1.1 meters tall by 0.7 to 1 meter wide (Figure 411). Mid-twentieth century bottles were noted in the general vicinity of the wall, but no other cultural material was seen. The southwestern end of Site 30740 is situated 35 meters east of the makai termination of Site 30738, and this wall may have been used in conjunction with that wall for Historic Period ranching purposes (i.e. to control the movement of cattle). Unlike Site 30738, however, the Site 30740 wall does not appear on the map of a portion of Ka'ū prepared by M.D. Monsarrat in 1887

(Hawai'i Registered Map No. 1455), suggesting that it may have been built subsequent to that date. (Clark and Rechtman 2019:340-341)

**Figure 75. Site 30740 wall (view to southwest; from Clark and Rechtman 2019:343).**

Site 30740 was interpreted as an historic ranching wall used to restrict the movement of cattle. It was assessed as significant for its information content (Criterion "d") by Clark and Rechtman (2019:413) and recommended for no further work.

## Site 50-10-74-30747

Site 30740 is an historic stone wall that extends through the northeastern portion of the Clark and Rechtman (2019) survey area inland of Highway 11. The majority of the wall is located within the current area of study, with the inland end extending *mauka* outside the area (see **Figure 4**). A plan map of the site is presented in **Figure 76** and a photograph of the wall is presented in **Figure 77**. The wall is described by Clark and Rechtman (2019) as follows:

> Site 30747 consists of a core-filled wall located in the east-central portion of the study area. The wall extends mauka/makai across TMK: (3) 9-5-014:017 within Honu'apo Ahupua'a for a total distance of approximately 1,045 meters. It generally stands 1 to 1.2 meters tall by 0.7 to 0.9 meters wide, but it is segmented into several sections by roads and associated bulldozing. The wall is constructed of neatly stacked pāhoehoe cobbles, however, both edges are obscured for long segments by tall Guinea grass. Christmas-berry, koa haole, cat's claw, lantana, kiawe, eucalyptus, and various other vines and weeds are also found growing along the route of Site 30747. The wall is currently used to control the movement of cattle across the study area, and a fence line follows its northern edge for most of its length, replacing the wall where it has been bulldozed away. Two wooden gates are present along the length of the wall where ranch roads cross it. The specific reason for the original construction of Site 30747 is not known, but it is likely that the wall was built during the Historic Period for sugar plantation/ranching associated purposes.

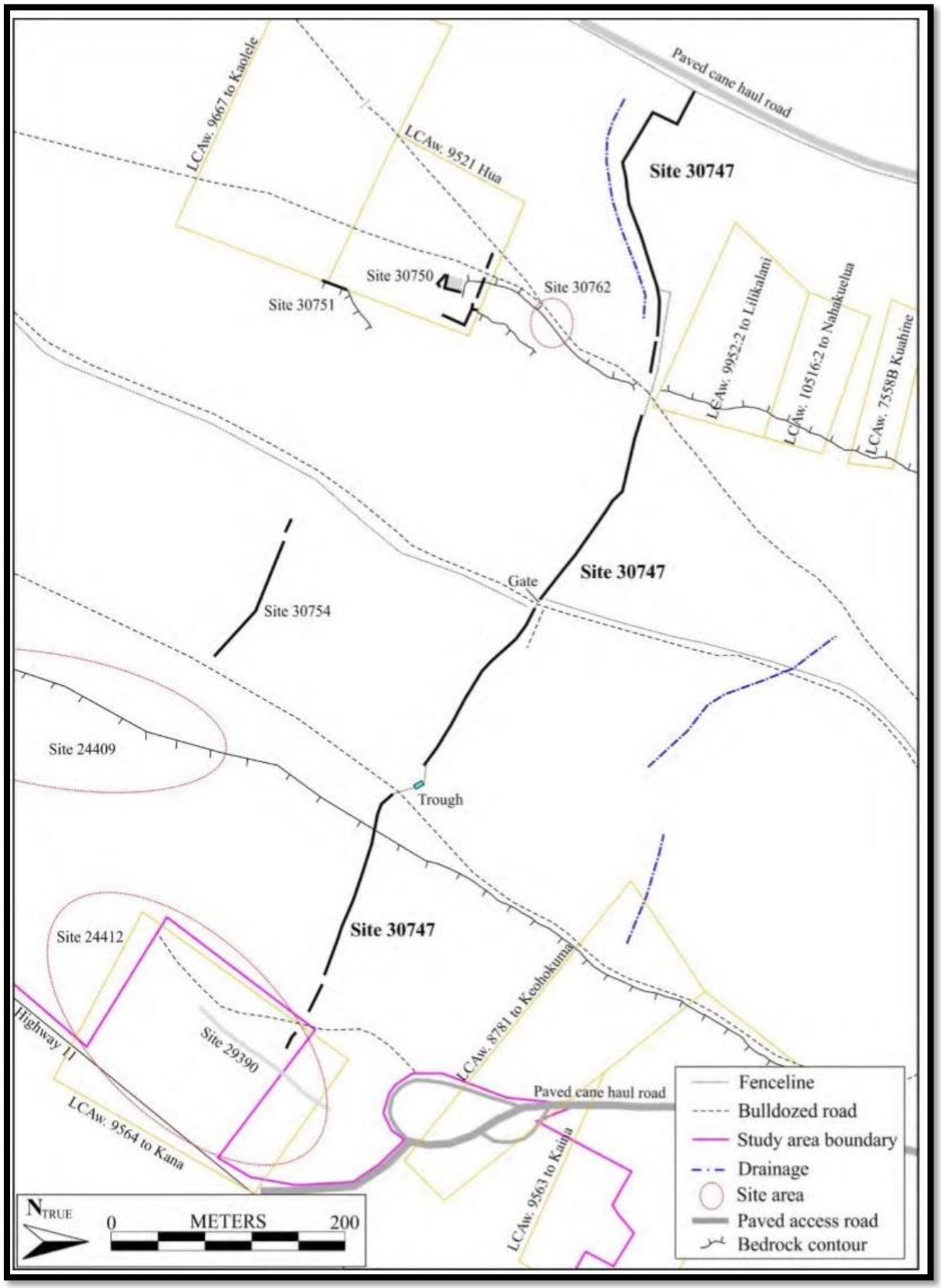


**Figure 76. Plan map of Site 30747 (from Clark and Rechtman 2019:369).**

**Figure 77. Site 30747 wall (view to north; from Clark and Rechtman 2019:372).**

The makai section of the Site 30747 wall shows up on a map of a portion of Kaʻū prepared by M.D. Monsarrat in 1887 (Hawaiʻi Registered Map No. 1455), indicating that at least a portion of the site was built prior to that date, and that the wall may have once extended further makai than it presently does. Cultural material associated with Site 30747 includes several ceramic insulators, imprinted with the maker's mark "LOCKE," that have been placed on the surface of the wall. These insulators, and a sawed-off utility pole adjacent to the southern wall edge, indicate that a line of Historic Period power poles once followed the wall route across the study area.

Currently, the makai termination of Site 30747 is situated roughly 110 meters northwest (*mauka*) of Highway 11, within the boundaries LCAw. 9564 to Kana (TMK: (3) 9-5-014:035), makai of the current study area. The wall begins roughly 50 meters north of one of the walls of Site 24412 (a Historic wall complex), and roughly 20 meters mauka of the Site 25240 railroad bed. From there it extends up slope (northwest) for 6.5 meters to an 11-meter break, where the wall has been bulldozed away at a road cut. It then continues for 64 meters to a wooden gate at an old road where the wall meets a perpendicular fence line (extending northeast/southwest) that turns to follow its northern edge mauka for the rest of its length. After a roughly 5.5-meter gap, the wall continues to the northwest up a steep section of slope for roughly 175 meters to a water trough where an 80-meter long section of wall is missing at an old cane haul road crossing. The fence line marks the former route of the wall across this gap, and the wall continues to the northwest on the opposite side of the gap for 155 meters to a ranch road with a gate across it. Here the wall is absent for a distance of 7 meters, before it picks up again and continues un-interrupted, up the steep slope, for another 200 meters to a prominent fault line that extends northeast/southwest across the study area. Here the terrain levels out, and portions of the wall have been bulldozed away. Intermittent sections of cobble alignments marking the wall base are present for a distance of 70

> meters as the wall crosses the fault formation. The wall then turns to the southwest and follows the northern edge of a drainage channel along a circuitous route up slope for 210 meters. It then turns ninety degrees to the northeast and extends across the base of the steep slope for 32 meters, before turning ninety degrees to the southwest once again and continuing up a very steep rocky slope for 28 meters to the makai edge of the paved cane haul road that provides primary access to the study area, where Site 30747 terminates. (Clark and Rechtman 2019:367-368)

Site 30747 was interpreted as an historic ranching wall used to restrict the movement of cattle. It was assessed as significant for its information content (Criterion "d") by Clark and Rechtman (2019:413) and recommended for no further work.

### Site 50-10-74-30751

Site 30740 is a terrace retaining wall located in the central portion of the Clark and Rechtman (2019) survey area, near the inland extents of the current area of study (see **Figure 4** and **Figure 77**). A photograph of the wall is presented in **Figure 78**. The wall is described by Clark and Rechtman (2019) as follows:

> Site 30751 consists of a terrace wall located in the central portion of the study area on TMK: (3) 9-5-014:017 within Honuʻapo Ahupuaʻa. The wall is situated near the southeastern (makai) boundaries of two adjacent kuleana parcels (LCAws. 9521 to Hua and 9667 to Kaolele), roughly 100 meters south of Site 30750, and along the edge of the same prominent fault formation that extends northeast/southwest across the study area. This general area has been subject to widespread mechanical clearing in the past, and as a result vegetation is limited primarily to Guinea grass, koa haole, and Christmas-berry, with a few scattered monkey-pod trees also present. The wall, which extends cross-slope (northeast/southwest) for a total distance of 21 meters, is constructed of stacked pāhoehoe cobbles and boulders against the face of a bedrock contour. The stacking rises 1.6 meters above the ground surface along its southeastern edge, but is flush with an artificially created, approximately 2.2-meter wide surface that it retains to its northwest. This leveled surface, and the terrace wall itself, slope gradually downhill to the north-northeast. The northeastern end of the terrace wall abuts a natural bedrock contour that continues down slope in a more northeasterly direction for approximately 40 meters. The route of the leveled surface appears to follow this contour for its entire length before becoming untraceable, but no additional stacking was noted against the bedrock contour.
>
> 30751 appears designed to retain the artificially leveled surface along its upslope edge, the specific function of the 2.2-meter wide pathway, which slopes gradually makai towards Honuʻapo Bay and the former Honuʻapo Sugar Mill, is not known, however. It is possible that the path dates to early Historic period, and represents the route of a former road leading to LCAws. 9521 and 9667. Alternatively, this pathway may have been a section of a later cane haul road, or the route of one of the wooden flumes once used by the plantation to carry the harvested cane from the fields to the mill. A boundary function cannot also not be eliminated for the terrace wall itself, as it is located very near, and oriented in the general direction of the boundaries of the adjacent kuleana parcels.

The Site 30751 terrace was assigned an indeterminate function, although it appears to have functioned as a transportation feature, used to support the side of a path or roadway. Alternative functions of a flume support or boundary were also proffered. The site was assessed as significant for its information content (Criterion "d") by Clark and Rechtman (2019:413) and recommended for preservation.

**Figure 78. Site 30751 terrace retaining wall (view to northwest; from Clark and Rechtman 2019:388).**

## Site 50-10-74-30754

Site 30754 is an historic stone wall that extends through the east-central portion of the Clark and Rechtman (2019) survey area inland of Highway 11 and the Site 24409 wall complex (see **Figure 4** and **Figure 77**). A photograph of the wall is presented in **Figure 78**. The site is described by Clark and Rechtman (2019) as follows:

> Site 30754 consists of a core-filled wall that extends mauka/makai (northeast/southwest) across TMK: (3) 9-5-014:017 in the east-central portion of the study area (see Figure 65). The wall is situated on a steep slope within Honuʻapo Ahupuaʻa, roughly 200 meters south of the Site 30747 core-filled wall and 75 meters northwest of the northern end of Site 24409. Beginning at its makai end, the wall extends up-slope (parallel to Site 30747) for approximately 128 meters. Site 30754 is fairly intact for most of its length, comprised of stacked pāhoehoe cobbles standing 1.1 meters tall by 0.9 meters wide, but the lands surrounding it have been subject to mechanical clearing in the past, and both ends of the wall currently terminate at bulldozing. A roughly 10-meter long section of the wall, 37 meters from its mauka end, has also been destroyed by bulldozing. Owing to the adjacent land clearing activities and the history of ranching on the property, vegetation along the route of Site 30754 consists primarily of Guinea grass, koa haole, Christmas-berry, and lantana, although the wall does pass through a stand of ironwood trees just makai of the 10-meter bulldozed break.
>
> No cultural material was observed on or adjacent to Site 30754, but given the core-filled construction style, the wall is interpreted as a Historic Period feature, likely built for sugar plantation/ranching associated purposes. This wall approximates the route of a wall shown on a map of a portion of Kaʻū prepared by M.D. Monsarrat in 1887 (Hawaiʻi Registered Map No. 1455), indicating that it may have been built prior to that date. If Site 30754 is the wall shown on that

**Figure 79. Site 30754 wall (view to north; from Clark and Rechtman 2019:394).**

> map (its actual location is roughly 65 meters further south than indicated on the map), then it may have once extended further makai than it presently does, ultimately joining with the wall at the northern extent of Site 24409, and formed the southern wall of a large enclosure against the southern edge of the longer, Site 30747 wall. (Clark and Rechtman 2019:393)

Site 30754 was interpreted as an historic ranching wall used to restrict the movement of cattle. It was assessed as significant for its information content (Criterion "d") by Clark and Rechtman (2019:413) and recommended for no further work.

## Site 50-10-74-30756

Site 30756 is an historic stone wall that extends through the northeastern portion of the Clark and Rechtman (2019) survey area, near the inland portion of the current area of study (see **Figure 4** and **Figure 74**). A photograph of the wall is presented in **Figure 80**). The site is described by Clark and Rechtman (2019) as follows:

> Site 30756 consists of a short section of core-filled wall located in the northeastern portion of the study area on TMK: (3) 9-5-014:017 within Honu'apo Ahupua'a. The wall is situated on a moderate to steep slope, roughly 50 meters mauka of the Site 25240 railroad alignment, and 65 meters southeast of the Site 30738 wall. The wall segment, which averages 70 centimeters wide and stands up to 80 centimeters (5 to 6 cobbles) tall, extends northwest/southeast (mauka/makai), up and down the slope, for approximately 10 meters. It has neatly stacked edges of small to large cobbles and boulders, with a fill of smaller cobbles between. Both ends currently terminate at bulldozing—the mauka end at an old cane haul road, and the makai end at bulldozing near one of the former plantation wells—indicating that the wall was likely longer in the past. While this wall segment, given its core-filled construction style, was likely built during the Historic Period, the specific function of Site 30756 remains uncertain. The location of the wall suggests that it's

**Figure 80. Site 30756 wall (view to east; from Clark and Rechtman 2019:397).**

> use may have been associated with former ranching/plantation activities on the property. (Clark and Rechtman 2019:396)

Site 30756 was interpreted as a probable historic ranching wall used to restrict the movement of cattle. It was assessed as significant for its information content (Criterion "d") by Clark and Rechtman (2019:413) and recommended for no further work.

## Site 50-10-74-30757

Site 30757 is a modified drainage situated northeastern portion of the Clark and Rechtman (2019) survey area, near the inland portion of the current area of study (see **Figure 4** and **Figure 74**). A photograph of the wall is presented in **Figure 81**). The site is described by Clark and Rechtman (2019) as follows:

> Site 30757 consists of a modified drainage located in the northeastern portion of the study area on TMK: (3) 9-5 014:017 within Honu'apo Ahupua'a. The drainage contains several discontinuous sections of cobble and boulder stacking. Vegetation within and along the drainage includes primarily Guinea grass, haole koa, kiawe, banyan, kukui, 'opiuma, cat's claw, and Christmas-berry. The stacking occurs over the course of roughly 170 meters along the edges of this fairly deep drainage channel that passes north of Site 24404 (a former Japanese Cemetery), as it descends from the paved cane haul access road to a road that follows the former route of the Site 25240 railroad. The stacking ranges from a few short sections of cobbles placed against the edge of the drainage to the height of the terrain beyond, to taller wall constructions that rise up to 1 meter above the drainage edge. Old, rusted lengths of barbed wire fence associated with the stacking, and found along the edge of the drainage in between the sections, suggest that the modification to the drainage was meant to shore up a fence line, and create barriers designed to prevent livestock from crossing the channel. The age of the barbed wire suggests that this modification

**Figure 81. Site 30757 wall (view to south; from Clark and Rechtman 2019:398).**

> probably dates to the late Historic or early Modern Period. The specific modifications to the Site 30757 drainage include—beginning at the northwestern end of the drainage along its northern edge—a 7-meter long section of low stacking flush with the top edge of the drainage; a roughly 35-meter long, section of bulldozer pushed boulders and wall-like stacking, located 65 meters to the southwest (just below where an old cane haul road formerly crossed the drainage feature) at bend along the northern edge of the drainage; and a 2-meter long section along the southern edge of the drainage adjacent to the old railroad alignment, where it appears that the fence may have turned to the southwest to follow the road/railroad alignment. (Clark and Rechtman 2019:396)

Site 30757 was interpreted as a probable historic modification to a natural drainage, likely used in association with ranching activities in the area. It was assessed as significant for its information content (Criterion "d") by Clark and Rechtman (2019:413) and recommended for no further work.

# APPENDIX B – AUGUST 22, 2007 (1) SHPD LETTER

6613

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

**STATE OF HAWAII**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**
STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

COMPLETED

August 22, 2007

Mr. Joseph Kennedy
Archaeological Consultants of the Pacific
59-624 Pupukea Road
Hale'iwa, Hawai'i 96712

LOG NO: 2006.3821
DOC NO: 0708LM02
Archaeology

Dear Mr. Kennedy:

**SUBJECT:** **Chapter 6E-42 Historic Preservation Review-**
**Archaeological Inventory Survey**
**Ki'oloku & Kaunamano Ahupua'a, Ka'u District, Island of Hawai'i**
**TMK: (3) 9-5-012:017 & 026**

Thank you for submitting the revised report for review by Guerriero, Gregg & Kennedy (2005). The report summarizes the results of an Archaeological Inventory Survey conducted at the request of Mr. Chris Manfredi of Big Isle Ventures, LLC. Four Sites were identified during the survey. SIHP Sites -24381 and -24383 were evaluated for significance under criteria b, c and d, SIPH Site -24382 under a, b, c and d, and SIPH Site -24384 under criteria d only. No further work was recommended for SIPH Site -24384, a ranching wall, and Data Recovery was recommended for the other three sites.

The report is of good quality and has addressed the comments and concerns raised in the review letter dated May 1, 2006 (Log No. 2006.1276 Doc No. 0604JT30). The report generally satisfies the requirements of HAR 13-276 and is therefore accepted.

Please contact Ms. Lauren Morawski (O'ahu Archaeologist) at (808) 692-8019 if you have any questions or concerns regarding this letter.

Aloha,

Melanie Chinen, Administrator
State Historic Preservation Division

LM:jen

AUG 23 2007

# APPENDIX C – AUGUST 22, 2007 SHPD LETTER

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

**STATE OF HAWAII**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

August 22, 2007

Mr. Joseph Kennedy
Archaeological Consultants of the Pacific
59-624 Pupukea Road
Hale'iwa, Hawai'i 96712

LOG NO: 2006.3820
DOC NO: 0708LM03
Archaeology

Dear Mr. Kennedy:

SUBJECT: Chapter 6E-42 Historic Preservation Review-
Archaeological Inventory Survey Report
Hi'ona'a & Honu'apo Ahupua'a, Ka'u District, Island of Hawai'i
TMK: (3) 8-5-012:026 & (3) 9-5-014: various

Thank you for submitting the revised report for review by Guerriero, Gregg & Kennedy (2005). The report summarizes the results of an Archaeological Inventory Survey conducted at the request of Mr. Chris Manfredi of Big Isle Ventures, LLC. Ten historic properties were identified during the survey. Archaeological Consultants of the Pacific recommended that all sites be determined significant under criterion D for the information they provide about past land use. SIHP Sites -24403 and -24407 are additionally recommended for significance under criterion E; SIPH Site -24404 additionally under criteria A and E; and SIPH Site -24405 additionally under criterion A. A combination of Data Recovery, Preservation and no further work was recommended for the sites.

The report is of good quality and has addressed the comments and concerns raised in the review letter dated May 12, 2006 (Log No. 2006.1379 Doc No. 0604JT46). The report generally satisfies the requirements of HAR 13-276 and is therefore accepted.

Please contact Ms. Lauren Morawski (O'ahu Archaeologist) at (808) 692-8019 if you have any questions or concerns regarding this letter.

Aloha,

for Melanie Chinen, Administrator
State Historic Preservation Division

LM:jen

AUG 23 2007

# APPENDIX D – FEBRUARY 4, 2013 SHPD LETTER

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ESTHER KIA'AINA
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

**HISTORIC PRESERVATION DIVISION**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**

601 Kamokila Boulevard, Suite 555
Kapolei, HI 96806

February 4, 2013

Robert B. Rechtman, Ph. D.
Rechtman Consulting, LLC
507-A East Lanikaula Street
Hilo, Hawai'i 96720
(bob@rechtmanconsulting.com)

LOG NO: 2013.0086
DOC NO: 1301SN14
Archaeology

Dear Dr. Rechtman:

SUBJECT: **Chapter 6E-8 Historic Preservation Review –**
**Revised Archaeological Inventory Survey for the Proposed Park Expansion at Honu'apo**
**Honu'apo and Hi'ona'ā Ahupua'a, Ka'u District, Island of Hawai'i**
**TMK: (3) 9-5-014:053, 054, 055, 056, 057, 058 and 059**

Thank you for the opportunity to review the revised report titled *An Archaeological Inventory Survey of TMKs: (3) 9-5-014:053, 054, 055, 056, 057, 058, and 059 for the Proposed Expansion of the County Park at Honu'apo Bay Honu'apo and Hi'ona'ā Ahupua'a, Ka'u District, Island of Hawai'i* (M. Clark, D. Nelson and R. B. Rechtman, June, 2012 RC-0584). We received your revisions on January 22, 2013.

The survey area is roughly 125 acres located in Honu'apo and Hi'ona'ā Ahupua'a on lands acquired by the State of Hawai'i in 2006 and set aside for the County of Hawai'i for Estuarine Land Conservation and Public Recreation. Fieldwork was guided primarily by earlier reports (Ayres 1970, Haun et al. 2004) to locate features previously identified. The survey employed several transects along the coastline at 20 m intervals. The inland portions of the project area were not surveyed systematically due to extreme vegetation, making walking impossible. However, upon locating the previously identified sites, transects of 10 m were conducted in the vicinity of these sites to look for additional features not included in these previous reports.

Fifty-eight previously identified sites containing 141 features were identified within the project area. The following sites are recommended as significant under Hawaii Administrative Rule (HAR) 13-275-6 Criterion "d" only: a historic concrete flume (SIHP Site 22356), 14 habitation enclosures and complexes (SIHP Sites 22383-P, 26923, 26924, 26925, 26929, 26931, 26932, 26933, 26940, 26941, 26942, 26943, 26950, 26958), a habitation blister (SIHP Site 26926), a historic survey monument (SIHP Site 26922), two modified outcrops (SIHP Sites 26928, 26947), a modified depression (SIHP Site 26937), two quarry sites (SIHP Sites 26938, 26966), a three-sided enclosure (SIHP Site 26935), eight alignments (SIHP Sites 26939, 26944, 26951, 26953, 26954, 26955, 26972, 26973), six cairns (SIHP Sites 26963, 26967, 26968, 26969, 26970, 26971), a modified crack (SIHP Site 26952), three modified lava blisters (SIHP Sites 26956, 26957, 26959), and a cobble pile (SIHP Site 26974).

Fifteen sites are recommended as significant under HAR 13-275-6 Criterion "d" and "e" These include; Kamala'i Heiau (SIHP Site 3583), thirteen sites associated with burial and/or religious practices (SIHP Sites 26927, 26930, 26934, 26936, 26946, 26948, 26949, 26960, 26961, 26962, 26964, 26965, 26975) and the salt pans and bait cups (SIHP Site 26921). One site, the remnants of the Old Governement Road (SIHP Site 26945) was determined to be significant under HAR 13-275-6 Criterion "a" "c" and "d". Recommended treatment for all 58 sites is preservation.

SHPD previously reviewed a draft of this report, and revisions were requested (*Log 2010.0747, Doc 1211SN02*). We believe that the revisions made in this report have satisfied the questions raised in our previous correspondence. SHPD concurs with the significance assessments for all sites. We concur with the recommended treatment of preservation for all sites; and we concur with the recommendation that the surrounding and intervening landscape for the entire project area be preserved.

We look forward to the opportunity to review a preservation plan for the archaeological sites not containing burials. We also look forward to receiving a burial treatment plan for the sites with burials, prepared in consultation with lineal and cultural descendents, and submitted to DLNR-SHPD and the Hawai'i Island Burial Council and for review and approval.

This report meets the requirements of HAR 13-276-5 and is accepted by SHPD. Please send one hardcopy of the document, clearly marked FINAL, along with a copy of this review letter and a text-searchable PDF version on CD to the Kapolei SHPD office.Please contact Sean Nāleimaile at (808) 933-7651 or Sean.P.Naleimaile@Hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,

Theresa K. Donham
Archaeology Branch Chief

# APPENDIX E – DECEMBER 27, 2019 SHPD LETTER

DAVID Y. IGE
GOVERNOR OF
HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
FIRST DEPUTY

M. KALEO MANUEL
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

**STATE OF HAWAII**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD., STE 555
KAPOLEI, HI 96707

December 27, 2019

IN REPLY REFER TO:
Log No. 2018.00273
Doc. No. 1912SN05
Archaeology

Robert Rechtman, PhD
ASM Affiliates
507-A E. Lanikaula Street
Hilo, HI 96720
brechtman@asmaffiliates.com

Brian Roland
Ka'ū Mahi, LLC.
1400 16th Street, Suite 320
Denver, Co. 80202
Brian.roland@rlholdings.com

Dear Dr. Rechtman and Mr. Roland:

SUBJECT: **Chapter 6E-42 Historic Preservation Review –**
**"Update" Archeological Inventory Survey of the Ka'ū Mahi, LLC, Honu'apo Lands Hi'ona'a, Honu'apo, Kī'olokū, and Kaunāmano Ahupua'a, Ka'ū District, Hawai'i**
**TMK: (3) 9-5-012:017, 026, 039, 040, 041, 042, 043; and (3) 9-5-014:008, 011, 017, 041, 045, 048**

Ka'ū Mahi, LLC proposes to consolidate and re-subdivide the ~1,752-acre subject property. ASM Affiliates conducted an updated archaeological inventory survey (AIS) at the request of Ka'ū Mahi, LLC, due to the presence of historic properties not recorded during two previous AIS studies (Guerriero et a. 2006a, 2006b).

This letter provides the State Historic Preservation Division's (SHPD's) review of the draft AIS report titled, *An Update Archaeological Inventory Survey of the Ka'ū, TMKs (3) ) 9-5-012:017, 026, 039, 040, 041, 042, and 043; and (3) 9-5-014:008, 011, 017, 041, 045, and 048, Hi'ona'a, Honu'apo, Kī'olokū, and Kaunāmano Ahupua'a, Ka'ū District, Island of Hawai'i* (Clark and Rechtman February 2018; revised November 2019). SHPD requested revisions, received the revised draft via email on November 11, 2019 (Matt Clark [ASM Affilliates] to Susan Lebo and Sean Nāleimaile [SHPD]), and received final minor revisions via email on December 23, 2019.

The two previous AIS studies (Guerriero et al. 2006a, 2006b) identified 14 archaeological sites within the ~1,752 (Sites 50-10-74-24381 through 50-10-74-24384 and Sites 50-10-74-24403 through 50-10-74-24412). SHPD concurred with the site significance and mitigation recommendations and accepted the two AIS (Guerriero et a. 2006a, 2006b) reports in August 2007 (Log No. 2006.3820, Doc. No. 0708LM03 and Log No. 2006.3821, Doc. No. 0708LM02).

In January 2017, ASM Affiliates staff conducted a site visit in preparation of developing detailed mitigation plans for the historic properties identified in the previous AIS studies (Guerriero et al. 2006a, 2006b). They encountered several previously undocumented cultural features and, in a meeting on March 17, 2017, SHPD requested an "update" of the Guerriero et al. (2006a, 2006b) AIS studies, and specified an appropriate scope of work. The "update" AIS involved a 100% pedestrian survey of ~1,000 acres of the property which were assessed to have not been previously subjected to "widespread, plantation-era, land clearing."

The "update" AIS (Clark and Rechtman, November 2019) documented 48 sites containing 179 features, including all 14 of the sites identified by Guerriero et al. (2006a, 2006b) (Sites 50-10-74-24381 through 50-10-74-24384 and Sites 50-10-74-24403 through 50-10-74-24412), a section of the Hutchinson Plantation railroad (Site 50-10-74-29390), and 33 newly identified sites (Sites 50-10-74-30731 through 50-10-74-30763); several of the previously recorded sites were reorganized and reinterpreted in the "update" AIS.

The 14 previously-identified sites (Guerriero et al. 2006a, 2006b) further documented in the current AIS are:

- 50-10-74-24381 Habitation/Agricultural (Features A-AG)
- 50-10-74-24382 Habitation/Religious/Agricultural/Possible Burial Complex (Features A-U)
- 50-10-74-24383 Habitation/Religious/Agricultural Complex (Feature A-L)
- 50-10-74-24384 Historic Ranching/Boundary Wall
- 50-10-74-24403 Burial Complex (Features A-H)
- 50-10-74-24404 Former Japanese Cemetery
- 50-10-74-24405 Possible Burial Cave Complex (Features A-I)
- 50-10-74-24406 Habitation Cave Complex (Features A-D)
- 50-10-74-24407 Burial/Habitation Cave Complex (Features A-H)
- 50-10-74-24408 Historic Agricultural Sugarcane Complex (Features A-E)
- 50-10-74-24409 Traditional Agriculture Complex (Features A-M)
- 50-10-74-24410 Historic Ranching Complex (Features A-D)
- 50-10-74-24411 Linear Mound
- 50-10-74-24412 Historic Boundary (Features A-D)

The 34 newly-identified sites documented in the current AIS are:

- 50-10-74-30731 Habitation lava tube
- 50-10-74-30732 Habitation lava tube
- 50-10-74-30733 Habitation lava tube
- 50-10-74-30734 Historic Ranch complex
- 50-10-74-30735 Historic Boundary wall complex
- 50-10-74-30736 Historic Ranch complex
- 50-10-74-30737 Historic Burial platform
- 50-10-74-30738 Historic Ranch wall
- 50-10-74-30739 Historic Ranch wall
- 50-10-74-30740 Historic Ranch wall
- 50-10-74-30741 Precontact/early Historic Wall remnant/papamū
- 50-10-74-30742 Precontact/early Historic Wall remnant
- 50-10-74-30743 Historic Wall remnant
- 50-10-74-30744 Historic Boundary wall remnant
- 50-10-74-30745 Precontact Ceremonial Complex
- 50-10-74-30746 Precontact/early Historic Habitation enclosure
- 50-10-74-30747 Historic Ranch wall
- 50-10-74-30748 Historic Habitation terrace
- 50-10-74-30749 Terrace wall
- 50-10-74-30750 Precontact/early Historic Habitation complex
- 50-10-74-30751 Terrace wall
- 50-10-74-30752 Precontact/early Historic Possible burial structure
- 50-10-74-30753 Precontact/early Historic Possible burial structure
- 50-10-74-30754 Historic Ranch wall
- 50-10-74-30755 Historic Ranch wall
- 50-10-74-30756 Historic Ranch wall
- 50-10-74-30757 Historic Modified drainage
- 50-10-74-30758 Historic Survey marker
- 50-10-74-30759 Historic Ranch wall
- 50-10-74-30760 Precontact/early Historic Agricultural terrace
- 50-10-74-30761 Precontact Habitation lava tube

- 50-10-74-30762 'Ili'ili scatter
- 50-10-74-30763 Historic Boundary wall

The 48 sites are assessed as significant under Hawaii Administrative Rules (HAR) §13-284-6 Criterion d (have yielded, or is likely to yield, important for research on prehistory or history); two of the sites (Sites 24408 and 29390) are additionally assessed as significant under Criterion a for their relationships to nineteenth to twentieth century land use activities that greatly affected the local landscape and the economy of the Hawaiian Islands. Nine of the sites (Sites 24382, 24403, 24404, 24405, 24407, 30737, 30745, 30752, and 30753) are also assessed as significant under Criterion e given the presence or presumed presence of human skeletal remains and traditional-cultural uses of the sites. Consultation for the sites assessed under Criterion e was conducted with Mr. Keoni Fox, a cultural descendent of previously identified human remains identified within the current study area.

Based on the Clark and Rechtman (December 2019) "update" AIS findings, SHPD's project effect determination is "Effect, with agreed upon mitigation commitments." SHPD agrees with the recommendation of preservation of 29 sites (Sites 24381 through 24383, 24405, 24406, 24409, 29390, 30731 through 30733, 30736, 30737, 30741, 30742, 30745, 30746, 30748, 30750 through 30753, 30755, 30758, 30758, and 30761 through 30763); see Table 12 and Figure 517. The preservation sites include six sites (Sites 24381, 24382, 24383, 24406, 24408, and 24409) that were previously recommended for data recovery by Guerriero et al. (2006a, 2006b), five sites (Sites 24382, 24403, 24405, 24407 and 30737) assessed as possible Hawaiian burial sites and a former Japanese cemetery (Site 24404). Additionally, SHPD agrees with the recommendation of no further work for 19 sites (Sites 24384, 24408, 24410, 2441, 24412, 30734, 30735, 30738, 30739, 30740, 30743, 30744, 30747, 30749, 30754, 30756, 30757, 30759, and 30760), consisting primarily of historic-period ranching and plantation related features and remnant features that were severely damaged by prior land clearing associated activities, which are assessed as having been adequately documented; see Table 12 and Figure 517.

The report meets the requirements specified in HAR §13-276-5. **The report is accepted.** Please send two hard copies of the document, clearly marked FINAL, along with a copy of this review letter and a text-searchable PDF version to the Kapolei SHPD office, attention SHPD Library.

As stipulated in HAR §13-284-7, when SHPD comments that a project will result in "Effect, with agreed upon mitigation commitments," then detailed mitigation plans shall be developed for SHPD review and acceptance prior to project work commencing. **SHPD looks forward to** receiving for review and acceptance a preservation plan meeting the requirements of HAR §13-277 for the 29 preservation sites (see above), and to receiving a burial treatment plan for the two confirmed burial sites (Sites 24403 and 24407) for submittal to the Hawai'i Island Burial Council in accordance with HAR §13-300-33.

Please contact Jordan Calpito at (808) 933-7650 or at Jordan.V.Calpito@hawaii.gov for questions or concerns relating to burials, and Sean Nāleimaile at (808) 933-7651 or at Sean.P.Naleimaile@hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,
*Alan Downer*

Alan S. Downer, PhD
Administrator, State Historic Preservation Division
Deputy State Historic Preservation Officer

cc. Matt Clark, mclark@asmaffiliates.com
John Stout, john.stout@rlholdings.com

# APPENDIX G

Certified Shoreline Survey

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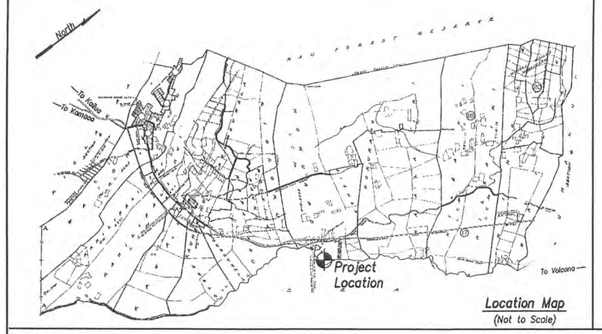
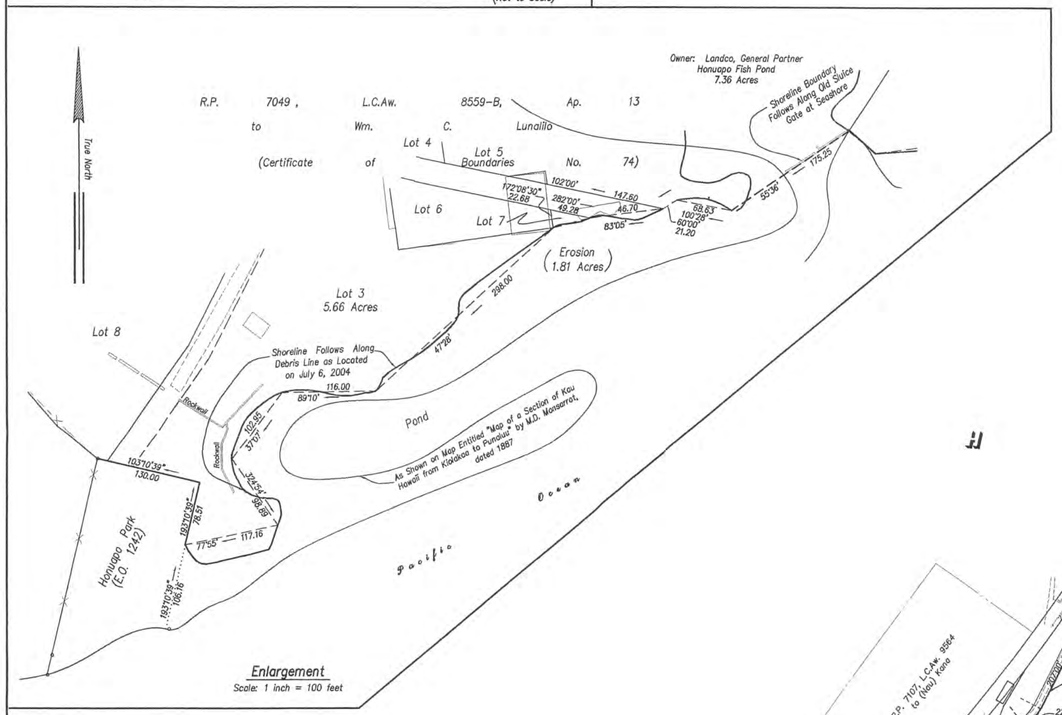
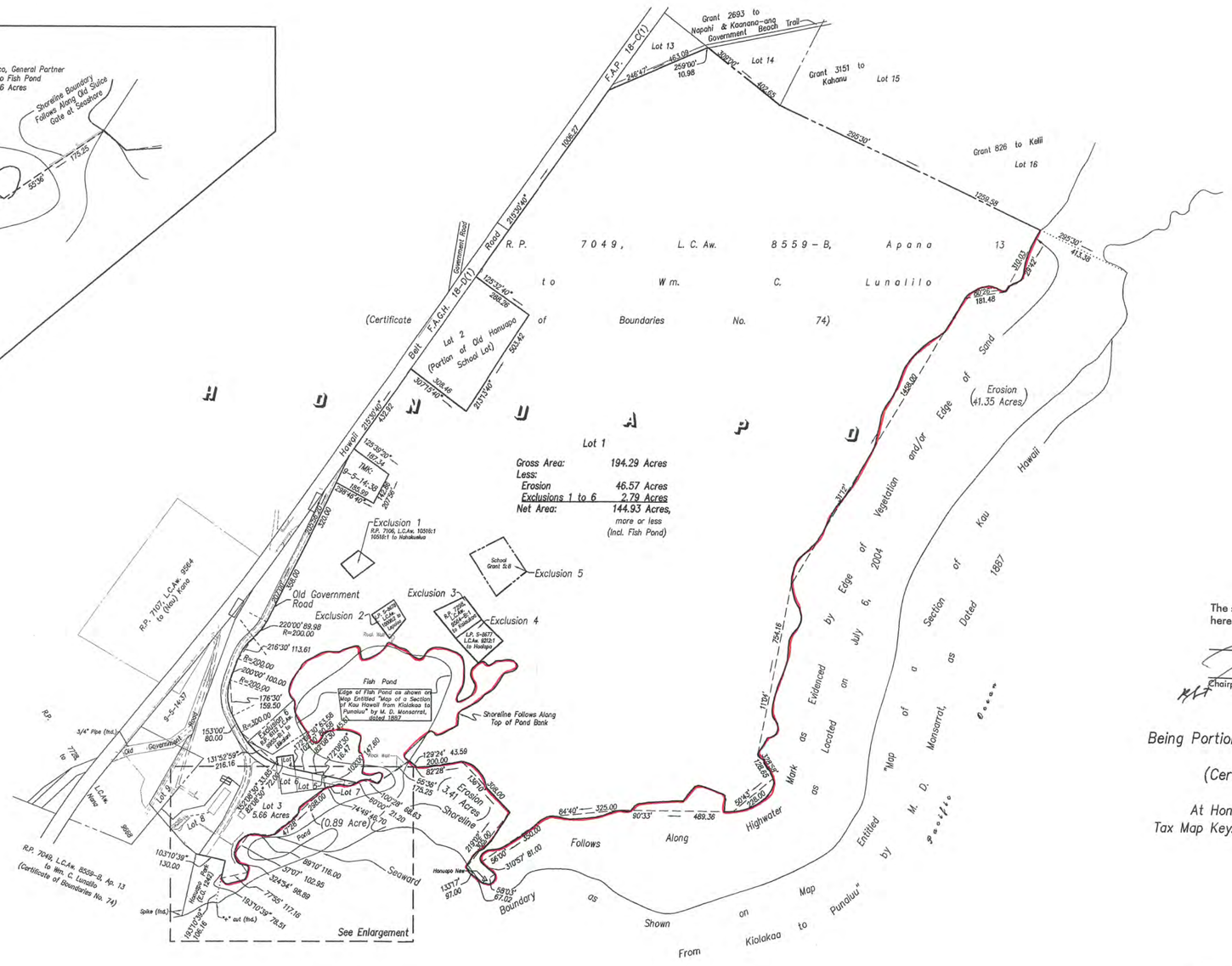



Location Map
(Not to Scale)




Scale: 1 inch = 300 feet

The shoreline as delineated in red is hereby certified as the shoreline as of
FEB 18 2005

Chairperson, Board of Land and Natural Resources

Shoreline Survey of
Lots 1, 3 and 7
Being Portions of R.P. 7049, L.C.Aw. 8559-B, Ap. 13 to Wm. C. Lunalilo
(Certificate of Boundaries No. 74)

At Honuapo, Ka'u, Island of Hawaii, Hawaii
Tax Map Key: 9-5-14: por. 7 & 37 (3rd Division)

Owner: Landco, General Partner
330 Primrose Road, Suite 210
Burlingame, California 94010

Notes:

Shoreline certification is for building permit purposes.

RUSSELL FIGUEIROA
LICENSED PROFESSIONAL LAND SURVEYOR
No. 4729
HAWAII, U.S.A.

This work was prepared by me or under my direct supervision

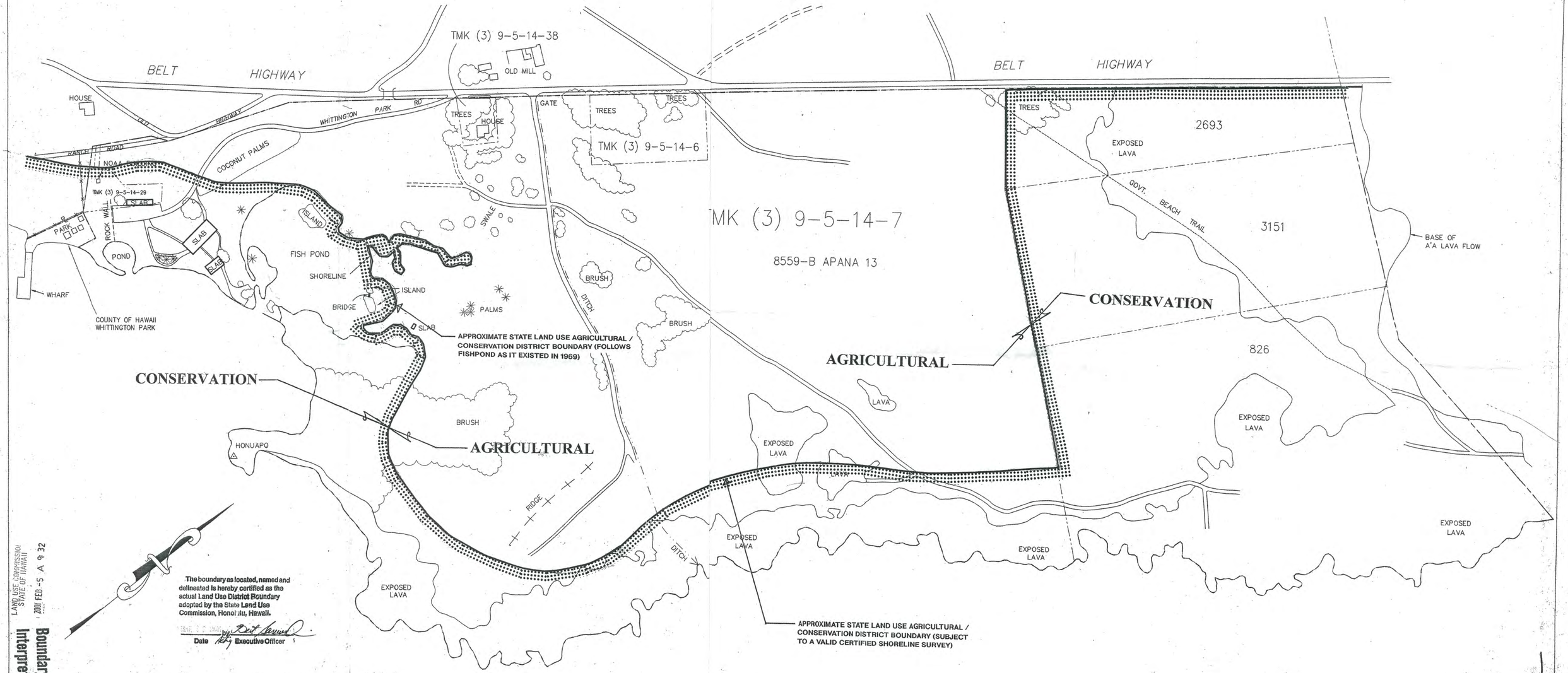
4/30/06
Russell Figueiroa Expiration Date
Licensed Professional Land Surveyor
Certificate Number 4729

Revised: December 15, 2004

RMTC Ref. No. 1-19416-2-S
F.N.: Honuapo-Shoreline.Dwg

R. M. TOWILL CORPORATION
SINCE 1930

73-5574 Maiau Street, Suite 11
Kailua-Kona, Hawaii 96740




LAND USE COMMISSION STATE OF HAWAII
2001 FEB -5 A 9:32

The boundary as located, named and delineated is hereby certified as the actual Land Use District Boundary adopted by the State Land Use Commission, Honolulu, Hawaii.

Date _____ Executive Officer

Boundary Interpretation No. _____

# HONU'APO RANCH 6

TRACING OF AERIAL PHOTO.
PHOTO SOURCE: AIR SURVEY HAWAII
1/26/01

0 200 400
SCALE: 1 INCH = 200 FEET

PALM TREE
BRUSH
ROAD
PROPERTY LINE
FENCE
RIDGE
DITCH
EXPOSED LAVA

Boundary Interpretation No. _____

# CONSERVATION DISTRICT BOUNDARY MAP

PHOTO #1
Time: 9:00 a.m.

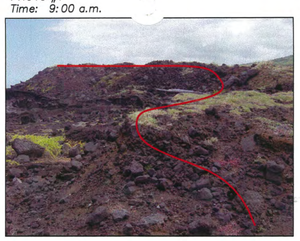


PHOTO #2
Time: 9:10 a.m.

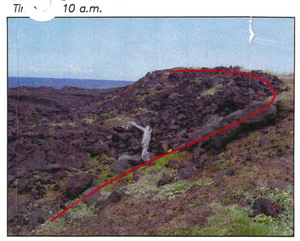


PHOTO #3
Time: 9:20 a.m.

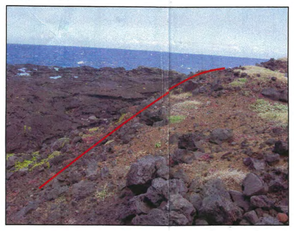


PHOTO #4
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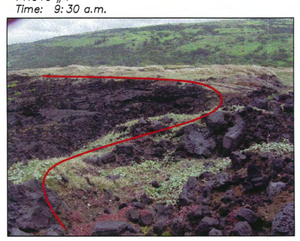

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Time: 9:40 a.m.

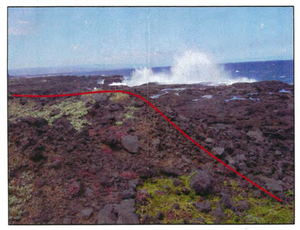

PHOTO #6
Time: 9:50 a.m.

PHOTO #7
Time: 10:00 a.m.

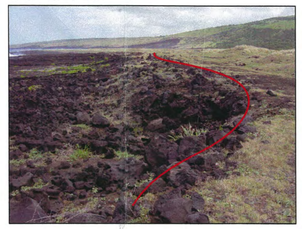

PHOTO #8
Time: 10:10 a.m.

PHOTO #9
Time: 10:20 a.m.

PHOTO #10
Time: 10:30 a.m.

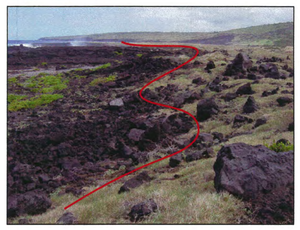

PHOTO #11
Time: 10:40 a.m.

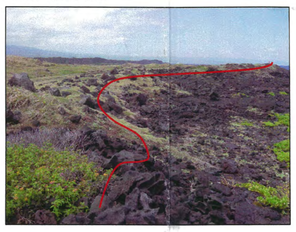

PHOTO #12
Time: 10:50 a.m.

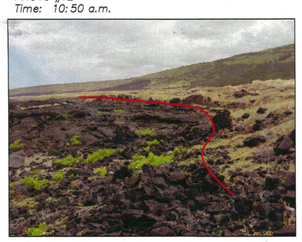

PHOTO #13
Time: 11:00 a.m.

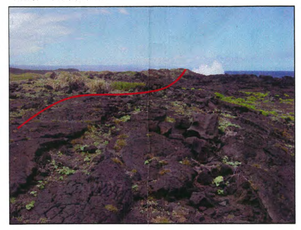

PHOTO #14
Time: 11:10 a.m.

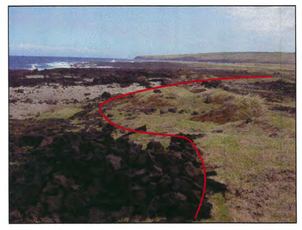

PHOTO #15
Time: 11:20 a.m.

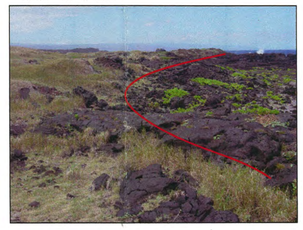

PHOTO #16
Time: 11:30 a.m.

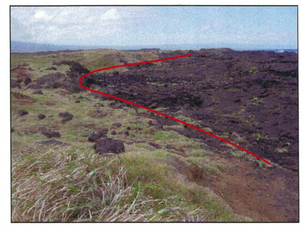

PHOTO #17
Time: 11:50 a.m.

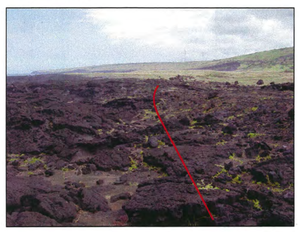

PHOTO #18
Time: 12:00 p.m.

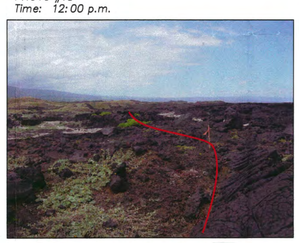

PHOTO #19
Time: 12:10 p.m.

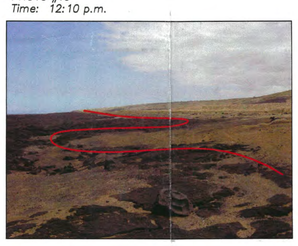

PHOTO #20
Time: 12:20 p.m.

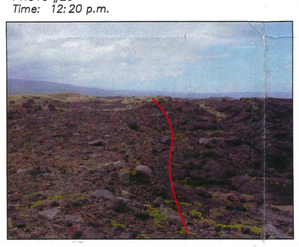

PHOTO #21
Time: 12:30 p.m.

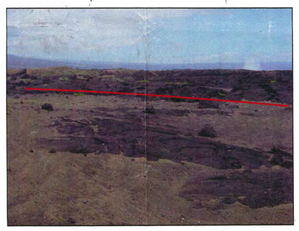

PHOTO #22
Time: 12:40 p.m.

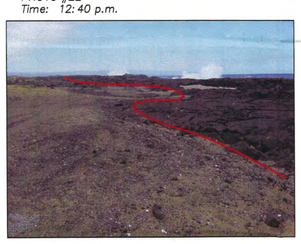

PHOTO #23
Time: 12:50 p.m.

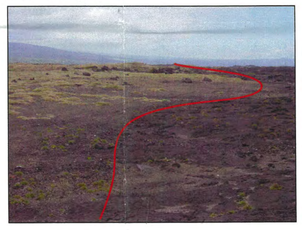

PHOTO #24
Time: 1:00 p.m.

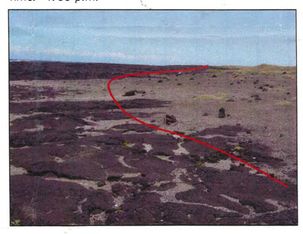

PHOTO #25
Time: 1:10 p.m.

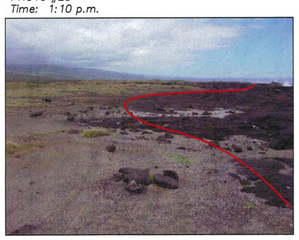

PHOTO #26
Time: 1:20 p.m.

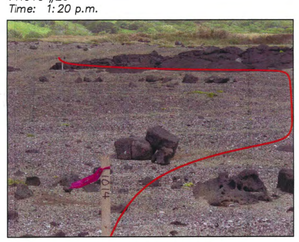

PHOTO #27
Time: 1:30 p.m.

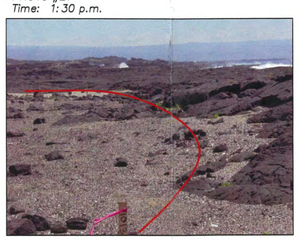

PHOTO #28
Time: 1:40 p.m.

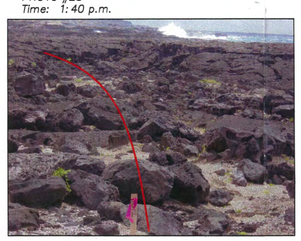

PHOTO #29
Time: 1:50 p.m.

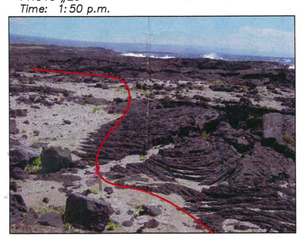

PHOTO #30
Time: 2:00 p.m.

PHOTO #31
Time: 2:10 p.m.

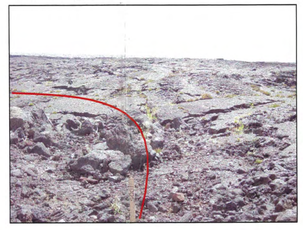

PHOTO #32
Time: 2:20 p.m.

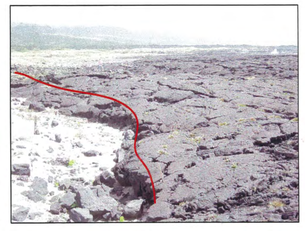

PHOTO #33
Time: 2:30 p.m.

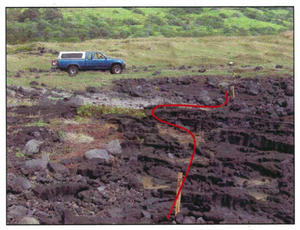

PHOTO #34
Time: 2:40 p.m.

PHOTO #35
Time: 2:50 p.m.

PHOTO #36
Time: 3:00 p.m.

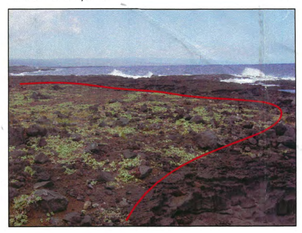

PHOTO #37
Time: 3:10 p.m.

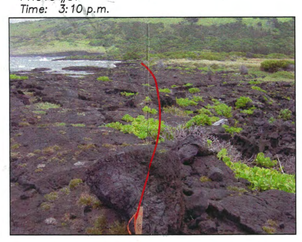

PHOTO #38
Time: 3:20 p.m.

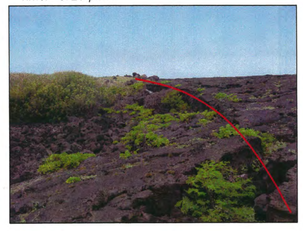

PHOTO #39
Time: 3:30 p.m.

PHOTO #40
Time: 3:40 p.m.

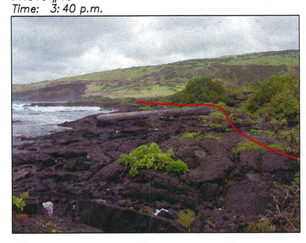

PHOTO #41
Time: 3:35 p.m.

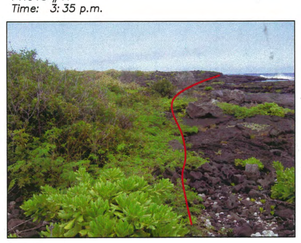

PHOTO #42
Time: 3:40 p.m.

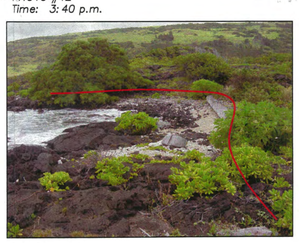

PHOTO #43
Time: 3:45 p.m.

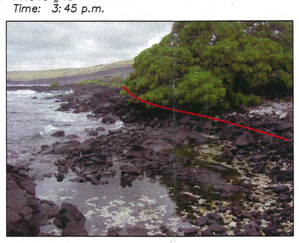

PHOTO #44
Time: 3:50 p.m.

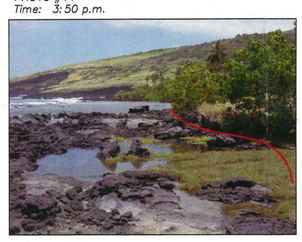

PHOTO #45
Time: 3:55 p.m.

PHOTO #46
Time: 4:00 p.m.

PHOTO #47
Time: 4:05 p.m.

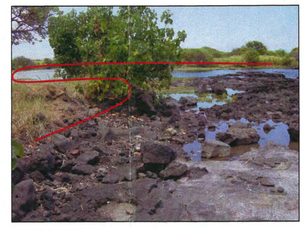

PHOTO #48
Time: 4:10 p.m.

PHOTO #49
Time: 4:15 p.m.

PHOTO #50
Time: 4:20 p.m.

PHOTO #51
Time: 4:30 p.m.

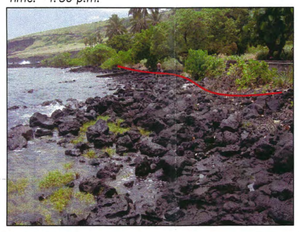

PHOTO #52
Time: 4:35 p.m.

PHOTO #53
Time: 4:40 p.m.

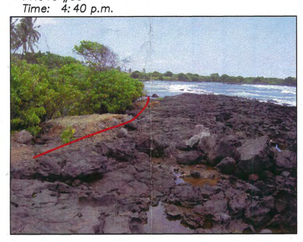

PHOTO #54
Time: 4:45 p.m.

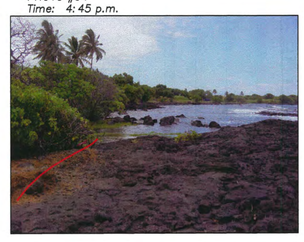

PHOTO #55
Time: 4:50 p.m.

PHOTO #56
Time: 5:00 p.m.

PHOTO #57
Time: 5:05 p.m.

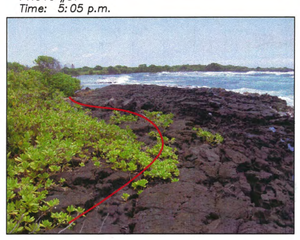

PHOTO #58
Time: 5:10 p.m.

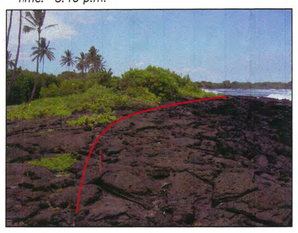

PHOTO #59
Time: 5:15 p.m.

PHOTOGRAPHS

SHORELINE SURVEY OF
LOTS 1, 3 AND 7
AT HONUAPO, KA'U, ISLAND OF HAWAII, HAWAII
TAX MAP KEY: 9-5-14: POR. 7 & 37

DATE OF PHOTOGRAPHY: JULY 6, 2004